The Builder.

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"Bibsworth," Worcestershire .....Mr. E. Guy Dawber, Architect.
"Brahan," Perth .....Messrs. Bedford and Kitson, Architects.
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Architecture at the Paris Salon.

AS usual, the central and most important exhibit in the architectural galleries of the Salon is a great scheme of restoration of classic buildings. This is M. Patouillard's "Etat actuel et restauration de l'Ile Tiberine, à Rome," the drawings of which, along with various sketches of ancient monuments in Greece and Italy, fill the greater part of one room. Although in this, as in other similar exhibits in former years, there is a great deal that is purely imaginative, M. Patouillard's restoration is of more interest than most that we have seen, both from the ability and effectiveness of the drawings, the peculiar nature of the subject, and from one or two interesting items among what may be called the documents on which the restoration is based.

The author's scheme and argument are briefly explained on a written card placed beneath the principal drawing. The Insula Tiberinus, now Isola San Bartolomeo, is a long narrow island, running to a point at each end, and reached from the opposite banks by two ancient bridges, the Pons Fabricius (Ponte Quattro Capi) on one side, and the Pons Cestius (Ponte San Bartolomeo) on the other side, facing each other near the middle of the island. The tradition is that, 293 B.C., an appeal to an oracle in respect of a pestilence was answered by a counsel to build a temple to Æsculapius on this island; that this was done, and that the temple stood near one end of the island, where now stands the mediæval church of San Bartolomeo. Furthermore, that to give importance to so sacred and important a spot, the island was built all round with a revêtement of masonry, and that, in view of its form, somewhat approaching to that of a long ship in plan, it was treated accordingly, and finished at the end near the temple in the likeness of the prow of a galley on a large scale, as if it were a great ship anchored in the stream. Not a trace of this treatment is left now, but the author exhibits a remarkable engraving by Piranesi showing unmistakably a part of the prow and some of the heavy rusticated masonry beyond it, as it existed in his time. Another of M. Patouillard's documents is a copy of a small drawing in the Orsini collection in the Vatican Library, which is labelled with the name of the island, and shows it in a ship form—far too pronounced, with its rising stem and stern, to be accepted as a literal representation; it is such a representation as one expects to find on a coin; but still there it is, the island in a ship form, with the two bridges indicated. On the "deck" of the ship, in this drawing, is shown a circular building near each end, accompanied by columned and pedimented screens in front of them; the circular building on the right is shown as colonnaded, that on the left is without an order. In the centre rises an obelisk. If M. Patouillard attaches any importance to this drawing as a piece of evidence, it is odd that he should have entirely neglected the suggestion of the circular temple at the right hand end, where no such feature is shown in his restoration; He accepts, however, the obelisk; and the suggestion of the circular building at the left hand end appears in the form of a circular turret, of more lofty proportions, close up to what would be the "stern" of the galley; but it is hardly the kind of feature which the Orsini drawing suggests.

In his brief statement the author does not cite his authorities from ancient literature, though referring to them as existing; and, writing this out of reach of any available sources of reference, we are not in a position at the moment to form a decisive opinion on the assumption on which his restoration is founded, except so far as regards the Orsini and Piranesi drawings just referred to; we may return to the subject of the archæological history of the Tiberine island on another occasion, when we can treat it fully. In the meantime, we can only describe what M. Patouillard shows us: He has an exceedingly fine and learned perspective drawing, taken from a high point of site, showing the island surrounded by the revêtement of rusticated masonry with a terrace all round; the near end of it built up in the form of the prow of a galley, and near this end the temple of Æsculapius, a hexastyle Corinthian peripteral temple parallel with the long axis of the island, the entrance facing towards the island, with an open square before it in the centre of which is an obelisk on the axial line. The temple and the square occupy almost exactly the position of the present church of San Bartolomeo and its fore-court; and how probable it is that a later church should be built nearly on the lines of a Pagan temple formerly occupying the site we of course know from many

instances. Facing the large temple, on the further side of the open space, is the small tetrastyle temple of Jupiter Jurarius—Jupiter in his capacity of presider over the fulfilment of oaths; and the remainder of the plan is occupied by a number of buildings symmetrically arranged, but of which the names and purport cannot be discerned at the height at which the plan is hung; the round turret before mentioned coming in at the rear. The end or prow of the island, behind and on each side of the Æsculapius temple, is occupied (as in such a case it undoubtedly would have been) by a crowd of votive altars and statues, and the river-god Tiber reclines on a long pedestal at the prow. The buildings along the margin of the island are shown as walled up, with engaged orders of pilasters, the spaces between occupied by mural inscriptions, and openings in the upper portion filled in with the well-known Roman form of cross-barred balustrading. The huge perspective view is of course accompanied by complete sections, plan, and elevations finished in the most elaborate manner; and the whole, whatever we may think as to its archæological probability, is a magnificent conception shown in a splendid set of drawings. The author's artistic abilities are further illustrated by a series of vigorous and effective water-colour drawings in Athens, Pompeii, and elsewhere. It is fortunate for M. Patouillard that he lives in a country where such talent as he displays is certain to be recognised and rewarded by commissions from a Government which never forgets an able and painstaking architect.

Apart from this great set of drawings, restorations are less numerous than usual. M. Girod shows a large drawing of the restored interior of a chamber in the Abbey of St. Germain-des-Prés, of Louis Treize epoch, which is a good piece of work, though we doubt the probability of the decorative painting of ceiling rafters shown, which looks more like modern French than like any possible Renaissance work; and M. Bourgeois exhibits two very elaborate historical drawings, intended as a parallel of the forms of civil, religious, and domestic architecture in France and Belgium "à travers les differents siècles," though the period embraced is really a very limited one. The two drawings each show one side of a *Place* lined with imaginary buildings of different dates, in elevation, but so coloured and treated as to have a pictorial effect. Each drawing is accompanied by a lengthy written analysis at the foot, in very small writing. It suggests one way of illustrating architectural history, by a combination of drawing and written analysis, and evidently represents a good deal of labour and thought, but it is a kind of thing which can hardly be studied to any purpose on the walls of an exhibition.

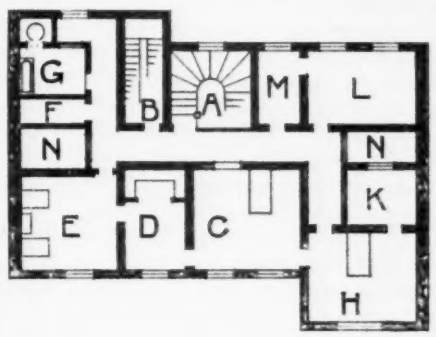
There are, as usual, a number of those ambitious *projets* for buildings which no one expects to see carried out, and a good many of which are probably the result of Ecole des Beaux-Arts competitions. Many of these serve at once to show how complete is the training received by French architects, and how mechanical may be the architecture resulting from such a scholastic system. M. Bouchet's "Une Gare Centrale de chemin de fer à Paris," a vast erection nearly all in glass and iron, is an admirable piece of constructional work, but absolutely devoid of the architectural effect which might be obtained in a great railway station. Another railway scheme which is equally unattractive architecturally, nevertheless deserves attention for its able and thorough working out of a practical problem; this is M. Jouven's "Un Centre Urbain," an idea evidently suggested by the work at present going on in Paris for the junction of the various metropolitan lines. M. Jouven shows a central station with three underground stories reached by lifts; the first of offices; the second a set of railways in arched tunnels with flat floors; the third, railways in tunnels of complete elliptical section. The plan shows the various lines of railway starting diagonally in four directions to serve all parts of the city; the scheme is very completely worked in elaborate sectional drawings; the buildings above ground, it must be admitted, have nothing to recommend them architecturally, but in a practical sense the whole is very cleverly thought out. Two or three large designs for an "Escalier de Musée" evidently represent a recent "Ecole" competition subject, and one of them, by M. Payret-Dortail (pupil of M. Laloux), in a vigorous treatment of French Renaissance, is a really fine design shown in an admirable set of drawings. Some of the details are rather too *rococo* in feeling, but the whole design is dignified and effective, with some originality and what one may call a great style about it. One cannot help wondering why it is that drawings produced for Royal Academy architectural prizes are for the most part so timid in style and execution compared with a set of drawings like this. The Academy set very good subjects sometimes, but the atmosphere seems to be different, and the sets of drawings produced would be nowhere beside the best examples of Ecole competition drawings. A design by M. Hébrard (pupil of M. Scellier de Gisors) for "Un Palais de l'Automobile" (does anyone really require such an establishment?), seems an inspiration from the Palais des Beaux-Arts, equally good in its refined and dignified treatment of the Classic order, and equally spoiled by an enormous and portentous glass roof, even bigger than that of the Palais. M. Fougerousse (pupil of M. Deglane) exhibits a very fine study for "Une Place Publique"; a fine colonnaded block at the top, with flanking terraces terminating at the front angle in a quarter circle worked into a picturesquely treated cupola above; the whole would make a really fine piece of city architecture to surround a large square. The design by M. Blondel for "Église Paroissiale pour la ville de X" one may conclude to be only a *projet*; as a design for a parish church it is a depressing example of the sort of architecture which seems to be regarded in France as suitable for a church—a kind of bastard Romanesque, as cold, hard, and deficient in charm as can be well imagined. Our imitation Gothic is better than this; or is it all matter of association, and could one learn to like it?

It is satisfactory to find that architectural exhibits at the Salon now include a far larger proportion of buildings actually carried out, or to be carried out, than was formerly the case. Ten years ago, in fact, one could hardly find any drawings representing the actual practical architecture of the day; nothing was to be seen but *projets* and drawings of ancient work. The latter still form a very large proportion of the show, but this year the illustrations of practical architecture are more numerous than we remember to have seen them before, and include some very interesting work. There are but two models this year, and not large ones. One of these is M. Lafore's monument to soldiers killed "Dans les Défilés d'El Moungar"; a fine design showing a lofty stele or obelisk crowned with a funeral urn, with a spirited draped female figure in front brandishing a sword. The other model is that of a funeral chapel in the Cimetière du Nord, by M. Boiret. This is a very "Art nouveau" affair, all ellipses; an elliptical arch in front, broken at the foot to allow passage to the entrance door; a short stumpy column rises from each foot of the curve, supporting at the top a square die worked out from the intrados of the elliptic arch; between the columns are the metal gates of the chapel. The elliptical archivolt is repeated on each face, and the whole crowned with an odd-shaped cupola in which elliptical lines again predominate. A huge palm-leaf, probably intended to be of gilt bronze, is applied in a spiral line to each of the front columns. The whole thing is original, but rather ingenious than beautiful. Among funeral monuments may be mentioned also the large drawing by M. Laroque, "Tombeau d'un Musicien," a marble stele with a bronze bust in front, and a lyre and other emblems worked on the face and base of the stele; the inscription on the monument states that it is to the memory of "Boullard, Fondateur de la Lyre Moulinoise"; apparently a local genius.

A piece of exceedingly practical architecture is illustrated in the set of large drawings of the "Usine Génératrice de la Compagnie du Chemin-de-fer Metropolitain," by M. Friesé. This is a long engine-house of immense size, with six great brick chimneys arranged in pairs on opposite sides of the building, two at each end and two in the centre; the end elevation is an imposing piece of brickwork, with a great arched window in the centre, and the two chimneys rising from corbelled bases at each side of the gable; the effect would have been still better, however, if their lines had been brought down to the ground. The administrative building, treated in a different and less massive manner, forms a separate block across one end of the engine-house. It is needless to add that complete sections, showing all the details of the machinery, are included in the drawings.

Among designs showing civic architecture is the design for the Chamber of Commerce at Roanne, by M. Blanvillain, in collaboration with M. Liault. This is an important building in the best style of modern French Renaissance; it is on an angle site with an elliptical angle vestibule finishing in an angle

cupola above; it shows a rusticated ground story, and upper stories with a considerable expanse of plain masonry, the first and second windows grouped in pairs into one design, with a carved panel separating them; the arrangement of the plan is both practical and effective. Another good civic building is M. Toussaint's "Caisse d'Epargne," at Pont-à-Mousson. As an instance of the manner in which national characteristics are reflected in architecture, one may notice how consonant it is with the peculiarly thrifty character of the French middle and lower classes that Savings Banks are among the most numerous class of public erections in France; the erection of a new "Caisse d'Epargne" in this or that town is one of the most frequent items of news we have to chronicle under the head of "France." M. Toussaint's building also is in the best style of modern French classic, severe and restrained in treatment. Among the examples of modern classic buildings one of the best is a private residence at Neuilly, by M. Bouwens van der Boyen, an architect whose name is well-known to many of our readers. For a classic villa in a first-class suburb this is quite a model design. The centre block, with a strongly-marked cornice, is divided into a centre and side compartments by four broad flat pilasters stopping against the architrave of the entablature, in the spaces between which the windows are grouped in two stories, the centre space in the upper story occupied by an inscription tablet within a garland; the lesser buildings form symmetrical one-story wings on each side of the centre block; the details are very refined and well considered, and without showing any startling originality, the result is a thoroughly satisfactory design. In the same category of severe classic design is M. Rives's residence in Rue Villaret-Joyeuse; and with these temperate and refined fronts one may contrast M. Périn's "House in flats at low rentals" on Boulevard Brune, a specimen of "Art Nouveau" in all its glory. The ground story is in stone, with yellow brick above, and a huge white coved cornice (stopped by projections at each end of the front) along which realistic green leafage meanders; similar leafage climbs about other portions of the front (what it is made of is not apparent), and the entrance is flanked by terminal figures the lines of which seem modelled from a corkscrew. Better the regulation classic than this kind of originality. That French architects can employ classic details, or what pass for such, with very coarse and commonplace results, is however unfortunately proved in M. Piquart's Municipal College at Châlons, with its huge finials over the cornice like the heads of nine-pins, and the segmental-arched cloister round the quadrangle. There is no form more unattractive for an arched cloister than a series of segmental arches of very slight rise; a warning to be noted. M. Renou's "Projet de Restauration du Château de Beauregard" may come under the head of practical work, as it includes considerable additions to and remodelling of an old château, of which the plan is at present in this form ⌐‾ but which is to be altered to ⌐¬. A good point in the ground-floor plan is that half the long block, the half next the courtyard, is occupied by a wide "Portrait-gallery" the whole length of the court front, which is not only a fine internal feature in itself, but serves as intercommunication, in place of the less dignified and more commonplace passage or corridor. On the upper floor the two wings are specially planned, the left-hand one as the family wing, with the parents', governess's, and children's rooms in the same corridor; the right-hand one as the privileged guests' wing—"Des Amis." Another private house, designed by M. Hocherau in collaboration with M. Paul Nelson, shows such an excellent piece of planning on the upper floor, and one so characteristic of the arrangements of a French private residence of the better class, that we give a rough sketch of the plan as far as it could be taken down rapidly in a note-book. A is the main staircase; B the service



stair, shut off by a door. C is Madame's room, D her *toilette* (for the ablutions and dressing are carried on in a separate room in a modern French house), with a large hanging cupboard (*Penderie*) at the upper end. E is the children's bedroom, with direct communication with Madame's room; no French lady, however *mondaine*, will let her children out of her direct care and inspection (a matter in which French fashionable ladies might give a lesson to many English ones); F is the linen closet; G the children's bath-room. On the other wing we have Monsieur's bedroom (H), and his *toilette* (K); L is his study; M a waiting-room for anyone who has to see him on business. N N are areas for light, the walls on each side being party-walls. Except the odd little kink at the end of the corridor next the bath-room, the object of which is not very apparent, this is about as compact and well-arranged a plan as could be for its purpose. The front elevation is another example of graceful and refined classic treatment, expressive of the best style of private residence.

The old style of French "Maison de Campagne," with its familiar congeries of timber gables and barge-boards at all angles, seems to be fortunately getting out of favour; at least we only noticed one example this year, though that one was of the most rampant description. Among designs of this class which show some special interest is that entitled "Une Villa Dans un Pays Chaud (Pour un Collectionneur)," though the title is only given in this general manner, appears like a real house, or might be one. The special features are that the exterior is finished white and decorated with figured friezes, which look like sgraffito; the principal bedroom is contained in a central erection rising above the rest, commanding air on all sides and with very extended eaves to keep the sun off the walls; and the special needs of a "collectionneur" are provided for by a large one-story wing in three square compartments, two for painting and the centre one for sculpture, and each top-lighted by a dome. M. Cochet is the architect; if it is not a house actually carried out, it is at all events of interest as a suggestion. Another interesting building among the minor works illustrated is the new "Groupe Scolaire" at Ivry-Port, by M. Despeyroux. The schools are one-storied buildings with a double roof and large mullioned windows; the interiors of the rooms have green tiled skirting and walls of a very light blue up to the top of the door-casings, with a graceful foliage ornament bounded by curved lines, forming a kind of frieze between the door heads; the walls white above this. Some pen sketches of constructional details are added; the whole is a very good and sensible piece of work. We may notice also M. Antoine's village church in Picardy, a curious and characteristic design in a kind of very severe quasi-Byzantine style; a stone plinth, dark red brick walls over, and circular windows set in a stone *encadrement* amid the brickwork. M. Bentz's "Eglise St. Joseph" (we are not told where) is in that kind of modern French-Byzantine style which was specially worked out by the late M. Vaudremer, and of which the most typical example is his church at Auteuil (more than once illustrated in our pages); the design is good of its type, but we do not love the type, nor understand the French fancy for it. M. Rives, whose Hôtel in the Rue Villaret-Joyeuse we have mentioned, exhibits with it a very fine water-colour drawing of an idea for a grand staircase, or rather, staircase hall—"Départ d'un Escalier," showing an interior of the most sumptuous description, with gilded balustrade, coloured marble panelling and sculpture, the whole rendered more effective by a brilliant flood of light cast over part of the picture from an unseen window, the rest being left in comparative shadow. As a study of architectural effect in water-colour it is one of the finest drawings we have seen.

Drawings illustrative of existing monuments are so numerous that they probably form a numerical half of the exhibits, though not occupying a proportionate space, as many of them are small. Among the most noteworthy are M. Fonseca's fifteen coloured drawings of the sculpture of the Cnidian friezes at Delphi; M. Tièche's large and fine coloured interiors of the Opera House and of some of the older Parisian churches; M. Brunet's three large frames of small sketches, "Croquis et Impressions de Voyage," very good of their kind—the sketches include a good many English subjects; M. Guidetti's water-colour sketches on the Acropolis, showing forcibly the effect of the ancient marble under strong sunlight; M. le Tourneau's drawings of the Byzantine crosses at the ancient churches of Kalabaka and Nojarelli, and also very fine views of the buildings themselves; and M. Chauvallon's water-

colour views of the ancient ramparts of Menneton-sur-Cher.

The new Salon, though it professes to have an Architectural Section, contains, as usual, nothing that is worth comment under that head, the architects at all events appearing to be faithful in a body to the Old Salon; and the specimens of furniture design, grouped in bays round part of the staircase hall, are so far inferior to the best of our work of the same class that they have little interest for an English visitor.

WORKMEN'S COMPENSATION.

THE Court of Appeal have again been sitting to hear Workmen's Compensation Appeals, and several decisions of interest to the building trade have already been given. Builders should especially note the case of Brindle *v.* Jones (the *Builder*, April 16, p. 419). A private dwelling-house was being whitewashed and repaired, and for this purpose three men each had a separate ladder placed against one of the gables, and in the process one of these men sustained injury. At the time he was injured a step-ladder was in the area supporting a plank the other end of which rested on a wall. This step-ladder and plank were not in use at the time of the accident, but had been so placed to carry out some part of the process. The County Court Judge had found as a fact that this was a scaffolding, and the Court of Appeal, on the authority of the decision of the House of Lords in Hoddinott *v.* Newton Chambers and Co., have held that, since no connexion is necessary between the workman and the scaffolding, the employers are liable, this being a building repaired by means of a scaffolding. It may be remembered that in the case of Maude *v.* Brook, decided in 1900, the present Master of the Rolls dissented from the majority of the Court, and held that there must be some connexion between the scaffolding and the accident. In that case a man fell down the well of a staircase, and the only "scaffolding" on the premises consisted of some planks placed on trestles in an attic remote from the place of accident. The House of Lords in Hoddinott *v.* Newton Chambers and Co. did not agree with the view expressed by the Master of the Rolls, but held that there need be no connexion between the scaffolding and the accident, since the use of scaffolding was only inserted in the Act to form an artificial line of demarcation between employment on certain buildings, to exempt certain classes of buildings, and possibly certain classes of builders. If the height of the scaffolding had to be commensurate with the height of the building, such a line of demarcation would have a logical basis; but, since this is not necessary, and even a plank placed on two trestles is deemed to be scaffolding, the law appears in a very unsatisfactory state, and as far as the injured workman is concerned it is immaterial whether the particular work on which he is engaged necessitates scaffolding being used or not.

In the case of Andrew *v.* Failsworth Industrial Society Limited (the *Builder*, April 16, p. 420) the Court of Appeal have held that a bricklayer engaged on a house above 30 ft. in height and being constructed by means of scaffolding, who was killed by lightning, was killed by an accident arising out of the course of his employment.

In the case of Dyer *v.* Swift Cycle Company a man had injured his finger in cleaning a bicycle. There was no machinery driven by mechanical power on the premises, which were used for the purpose of showing or selling bicycles and upon which certain repairs were effected; and the only ground on which the employers had been held liable was that the premises constituted a building exceeding 30 ft. in height where more than twenty persons, not being domestic servants, were employed, which, it was contended, rendered the premises a factory within section 105 of the Factory and Workshops Act 1901. The Court negatived this contention, since the section only enacts that such premises shall be deemed to be a factory for the purpose of enforcing certain provisions of the Factory Act, and does not cause them to be factories, as is the case in relation to docks, wharves, quays, and warehouses. The premises might have been a warehouse, but the Court declined to entertain this question, since it had not been raised before the arbitrator.

In the case of Norman and Burt *v.* Walder (the *Builder*, April 16, p. 419) a novel contention was raised that where a workman who had suffered injury in the course of his employment and had received weekly payments in respect of such injury subsequently set himself up in business, the earnings or profits derived from such business could not be taken into consideration so as to enable his employers to claim a review to reduce the amount so paid him as compensation. The County Court Judge had adopted this view, but the Court of Appeal reversed this finding and sent the case back for the County Court Judge to ascertain what were the profits derived from the business, and what profits were to be attributed to the man's own exertions in the business as apart from those of other members of his family employed by him. The Court pointed out that, although paragraph 1*b* of the First Schedule implies that a man must have been earning wages from an employer to obtain compensation under the Act, paragraph 2, which deals with the man's earning power after the accident, cannot be so limited, but the words "the amount he is able to earn after the accident" are wide enough to embrace trade profits.

A curious point as to dependency arose in the case of Wainwright *v.* C. and H. Crichton. The claim was made on behalf of a man aged 64 and his wife, who claimed to be entitled to compensation by reason of the death of a son by accident, and as wholly dependent upon him. The father, a boiler-maker, suffered from lumbago or pain in the back, the result of having been stabbed some time ago. It was alleged that on March 10 the son had entered into an agreement to maintain his father, and that on that date the man ceased work and had never resumed work until the son died on May 11, from the result of an accident which occurred on April 4. The father was shown to have been earning over 2*l.* a week from November to March, when he ceased work, and medical evidence was tendered to show he was still capable of working. The County Court Judge held he was debarred by law from admitting such evidence on the authority of a case (Price *v.* Penrikyber New Colliery Company) in which it was decided that the time of death was the time at which dependency must exist, and that a sum received by a dependant after the death of deceased out of earnings saved by him was not to be taken into account. The Court of Appeal reversed this holding and said the evidence should be admitted; the distinction between the two cases is very apparent, the evidence here being directed to the earning power of the dependant at the time of his son's death, and not, as in Price's case, to the position of the dependant after the death from a wholly extraneous circumstance.

NOTES.

The Proposed Thames Barrage.

WE are glad to find from a report of the Special Committee of the City Corporation on the Port of London that the scheme for the dockisation of the Thames from Richmond to Gravesend has been taken into serious consideration. As our readers may be aware, the scheme in question contemplates the construction of a regulating barrage similar to those across the Nile, so as to hold up the river to Trinity high-water level. The chief advantages to be derived from such a work are that the river would be converted into a lake of pure water served by numerous affluents, the principal being, of course, the flow over Teddington Weir, and that the current would flow in a downward direction only. It is believed that within a few weeks after the closing of the dam the upland waters would have forced over or through the dam all the foul waters of the river, which are now carried to and fro by tidal action, and that thenceforward the water would be of as good quality as that in the upper reaches of the river. Although not committing themselves to the expression of any definite opinion as to the merits of the scheme, the Committee urge that its practicability should be fully and impartially investigated, and that the Board of Trade should be invited to hold a public inquiry on the subject. It is satisfactory to note that this recommendation has been adopted by the Corporation, and that communications have already been opened on the matter with other public authorities in the metropolitan district.

The Recent Judgment in the House of Lords.

LAST week we commented on the main subject of the judgment of the House of Lords in the case of the Home and Colonial Stores *v.* Colls. In addition, however, to the chief question involved there are expressions of opinion in this judgment on two other points which are noteworthy. One is the strong enunciation of opinion by Lord Macnaghten that the Court should, whenever possible, award damages for interference with a right to light and not order an injunction. We have over and over again called attention to the importance of a change in the law whereby

it shall be incumbent on a Court to award damages and not issue an injunction, except in very exceptional cases. It is satisfactory to find this view supported in this recent judgment, and we trust that next session the Institute of Architects will obtain the introduction of a Bill on the point. Fortified by this judgment the Institute might well ask the Government to introduce a short Bill. The second point is the expression of opinion that the Court of First Instance should, if possible, obtain the view of a skilled architect or surveyor as to the results of an infringement of a right to light. Here again this opinion might well be the basis for some legislation by which disputes as to infringement of light might be referred to a skilled arbitrator, not to hear evidence, but to use his eyes and decide accordingly.

Enforcing the Provisions of the Building Act.

AN important point was decided in the case of The Attorney-General *v.* The Wimbledon House Estate Agency. On August 28, 1903, the defendants had submitted to the District Council certain plans of a house they proposed to erect, and work was commenced on the house on August 31. On September 8 the plans were returned to the defendants that certain amendments might be made in them to make them accord with the Council's by-laws, and on September 14 the required amendments were made. On September 23 the plans were disapproved, the alleged reason being that they were not in accordance with the by-laws, but the real reason—and this was explained to the defendants on September 28—was that a portion of the building, the billiard-room, was in advance of the main front wall of adjoining houses contrary to the provisions of the Public Health (Building in Streets) Act, 1888. By that date the walls had attained a considerable height, and on November 23 the Council took out a summons under section 3 of the above Act to recover penalties, and at a subsequent date penalties to the amount of 20*l.* were imposed. The present action was one at the instance of the Attorney-General for a mandatory injunction against the defendants. It was argued for the defendants that the only remedy was that conferred by the statute, which had been already enforced in the summary proceedings, and that, even if a second remedy was available, it could not be enforced against the same defendants after an election as to the remedy had been made. The Court negatived both these contentions and granted the injunction. It appears from the judgment that, the offence being a continuing one, the Council also could have gone on summoning the defendants as the penalties accrued due, even had the Attorney-General not proceeded in the matter.

Landlord and Tenant.

ON August 8 last we commented on the case of "Harman *v.* Ainslie," in which a point of everyday occurrence and of extreme importance to landlord and tenant was decided. This case has now been reversed on appeal, and is reported in the Law Reports for the current month. The lease under consideration contained the usual covenants to pay the rent, rates and taxes, and to repair, and a covenant not to assign, underlet, or part with the premises without the consent in writing of the landlord, which consent was not unreasonably to be withheld. There was also the usual proviso that if the lessee should commit any breach of the covenants "on his part to be performed," then the landlord should have the right to re-enter and the lease should be determined. The tenant committed a breach of the covenant not to sub-let, and Mr. Justice Wright decided that this did not give the landlord the right to re-enter since the word "performed" could have no application in the case of a negative covenant not to do a certain thing. The Court of Appeal have reversed this decision, giving to the word "performance" a wider and more businesslike construction as including not only the duty to do a certain thing, but also the duty to abstain from doing a thing, or, in other words, the duty to carry out an obligation undertaken. The decision is the more satisfactory since it sweeps away the technical distinction between leases which contain the word "observe" as well as "perform" in this connexion, and although it is remarkable that such a point should never have been absolutely decided before, seeing that this lease may almost be said to have been drawn in common form, it is satisfactory that it should now be settled on a businesslike footing and without a regard to legal subtleties.

Earth Pressures.

THOSE of our readers who are professionally concerned with the study of lateral earth pressures and related phenomena will find some interesting reading in a paper read last month before the American Society of Civil Engineers by Mr. E. P. Goodrich. There are many theories relative to the action of granular masses, to lateral pressures, planes of action, and planes of friction, but the results given by the formulæ evolved are somewhat at variance with each other, and with the results shown by such experiments as have already been conducted. The author of the paper to which we refer describes a comprehensive series of experiments which throw some new light on the subject generally, and will probably serve as the nucleus around which practicable working rules may be built.

The Electrification of London Railways.

WHILE the public have some ground for complaining that the companies controlling the suburban systems of railways in London show very little evidence of a desire to secure the advantages to be derived from the use of electricity, this backwardness is a fault of the directors rather than of their professional advisers. Proof of this is afforded by the evidence given at a recent sitting of the Royal Commission on London Traffic. Mr. Dawson, the consulting engineer to the London, Brighton, and South Coast Railway, pointed out very clearly the benefits to be derived from the electrification of suburban lines, showing that in addition to increased average speed, decreased cost of operation, and increased receipts, the companies would secure other important advantages by the change. For instance, electric tramways, instead of taking away passengers, would then serve as feeders and distributors of railway traffic. Mr. Dawson gave a very significant warning to the effect that if the companies merely experimented with electricity by sandwiching a few electric trains between local steam trains nothing but failure could be expected, as all the advantages of electric traction would be entirely lost. At the same sitting Mr. Cotterell, the chief engineer of the Liverpool Overhead Railway, detailed the advantages already derived from the use of electric traction in Liverpool, where horse trams and omnibuses have been superseded, not only in the neighbourhood of the docks, but throughout the city generally. There is no doubt that in the present day the horse is an anachronism so far as large cities are concerned, and the electrical engineer will play a very important part in abolishing an obsolete and unsuitable system of traction.

Messrs. Broadwood's New Premises.

WE mentioned the other day the transformation of Limmer's Hotel into new show-rooms and offices for Messrs. Broadwood, with some notes on the history of the site. Messrs. Broadwood have had the new premises on view during this week and last week, the contents being arranged to illustrate the evolution of the pianoforte from early times, and to show successive changes in construction. In the upper rooms are to be seen specimens of the Clavichord, Spinet, and Harpsichord. One of the earliest square pianofortes, by Zumpe (1766), is to be seen, followed by the improved instruments in the same form made by Johannes Broadwood in 1774 and for some twenty years after. Thence we come to the grand pianoforte and to the modern upright and cabinet pianofortes. Several examples of artistically treated grand pianofortes are to be seen, two or three of which have been illustrated in our pages. Among the modern instruments for sale in the ordinary course of business one is glad to notice a tendency towards the employment of more simple and truly constructional form in the design of the case and supports, in place of the old inartistic and *rococo* kind of design which was formerly the only thing to be had from a pianoforte maker, except in pursuance of a special order on the part of the purchaser.

MAGAZINES AND REVIEWS.—We are obliged to postpone till next week our usual notice of "Magazines and Reviews."

ARCHITECTURE IN CAPE COLONY.—A meeting was held on the 8th ult. at the Rhodes Building, at the invitation of Mr. F. Masey, F.R.I.B.A., of the members of the Royal Institute of British Architects resident in Cape Town, to consider the expediency of doing something to forward the cause of architectural education in the colony, more particularly with regard to Cape Town. On discussion, it was agreed that, as soon as prospects justified such action, an effort should be made to secure some systematic teaching of architecture in one or more of the representative colleges in the colony, and that in the meantime the matter could be best advanced by arranging for an Intermediate examination for the Institute to be held in Cape Town as soon as possible. Mr. H. Baker being at the present moment in London, it was arranged that he should be asked to approach the authorities as to the possibility of the proposal being carried into effect.

THE ARCHITECTURAL ASSOCIATION.

An ordinary general meeting of the Architectural Association, the last for session 1903-04, was held on Friday last week in the Meeting-room of the Royal Institute of British Architects, Mr. H. T. Hare, President, in the chair.

The minutes and nominations having been read and confirmed, the following gentlemen were elected as members, *i.e.*, Messrs. G. B. Clay, S. H. J. Murch, A. B. Scarlett, G. B. Cobbett, J. R. Musto, C. B. Cleveland, J. W. Keasley, and H. Kershaw.

New Premises Fund.

The Chairman announced the following further donations to the New Premises Fund, *i.e.*, Messrs. J. H. Christian, 10*l.* 10*s.*; Professor Henry Adams, 5*l.* 5*s.*; W. H. Jamieson, 5*l.*; J. H. Belfrage, 1*l.* 1*s.*, and L. Simmons (second donation), 1*l.* 1*s.* The Chairman added that this was the last meeting of the session, and he desired to call attention to the fact that the Association still had a large deficit to meet, and he hoped that donations would continue to come in liberally. It would be some time before the Association was free from debt on the new premises, and he hoped that all members would bear that in mind.

The Chairman also announced that the Members' Dinner will be held at the Criterion Restaurant, Piccadilly-circus, on Friday, May 13.

Mr. Louis Ambler, Hon. Secretary, proposed a vote of thanks to Mr. Clyde Young for allowing a party of members to visit the new War Office buildings on April 23. This having been agreed to, Mr. Ambler announced the first summer visit—to Moor Park, Rickmansworth—on May 14.

Officers for Session 1904-1905.

The Chairman then read the Scrutineers' Report on the election of officers, and proposed a vote of thanks to Messrs. Denington, Paul, Simmons, and Yates for acting as scrutineers. There were 383 voting papers and fourteen were rejected. The following is the result of the voting:—As President, Mr. E. Guy Dawber; as Vice-Presidents, Messrs. A. T. Bolton and J. S. Gibson; as Committee, Messrs. Henry T. Hare, R. S. Balfour, W. A. Pite, Arnold Mitchell, John Murray, G. B. Carvill, Walter Cave, J. MacLaren Ross, A. Needham Wilson, and E. W. Wimperis; Hon. Treasurer, Mr. Francis Hooper; Hon. Librarian, Mr. W. A. S. Pettit; Hon. Secretaries, Messrs. Louis Ambler and H. Tanner, jun. Other officers:—Hon. Solicitor, Mr. W. H. Jamieson; Hon. Assistant Librarians, Messrs. E. Gunn and C. M. Crickmer.

Mr. A. Needham Wilson then proposed a vote of thanks to the School of Design visitors, the retiring President and Committeemen, and the Press. The Association owed a great debt of gratitude to the School of Design Visitors, he said, and their efforts on behalf of the students were particularly gratifying. The Association was also under a special debt of gratitude to the President and the retiring Committee, and he thought that those gentlemen must be glad to see the work of the Association brought up to the satisfactory stage of being housed in their new premises; and in that connexion he hoped that the debt, which would be a burden to future presidents, would soon be extinguished. As to the Press, the Association was very grateful to them for the admirable manner in which they reported the meetings.

Mr. Simmons seconded the motion, which was heartily agreed to.

The Chairman, in reply, expressed his thanks and the thanks of the retiring Committee for the vote of thanks. Attendance at the Committee meetings involved a sacrifice of time, but they were all glad to do what they could to further the interests of the Association in every way. It was a labour of love to all of them.

The Value of Science in an Architectural Curriculum.

Mr. A. E. Munby then read the following paper:—

My excuse for introducing a paper upon the subject before you this evening must be that we live in an age of upheavals. Education, as all who take the most superficial interest in it must know, has recently undergone extraordinary changes. In every branch of teaching we see these changes; the stereotyped methods of learning modern languages have gone by the board, the time-honoured system of instilling mathematics has been shaken to its foundations by the power of the new school of exponents, history and geography are taught upon a rational plan and no longer as an isolated collection of facts, and the claims of science for a place in a liberal education, which ten years ago were ignored by many, are to-day absolutely undisputed. No professional course of training can remain unaffected by these changes in the work which precedes it, perhaps architecture, with its enormous range of subjects, less than any.

Even in the practical training of craftsmen the forward movement is apparent. The strenuous struggle for existence has killed the old-fashioned apprentice, the trades are no longer taught by kicks and rule of thumb, but with some regard to the principles on which they are based. Those of us who have seen anything of the life of London's fifty polytechnic and allied institutions, or of similar institutions in the provinces, to which thousands of men come willingly, often after a hard day's work, those who have seen how advanced much of such work is and who have noted the zeal and ability of the teachers, must be profoundly impressed with the effect which such advances will shortly have upon the professions. In the youngest of these schools, opened by the London County Council at Brixton two months ago, to be devoted entirely to the building trades, it is even proposed eventually to equip the workshops with a complete set of instruments and plant for tests on materials.

It would, however, be unfair to imply that the professions as a whole are indifferent to these advances. Years ago the medical profession discarded the old system of apprenticeship, organised its educational forces, and gave its members a protected status, with the result that the present system of teaching is far in advance of that of most other professions; hence the wonderful advances in medicine and surgery which we have seen within recent years, and our advances in pure science, which form the foundation of the advances in its applications, may be traced to a like cause.

Education for the Navy has long been systematised, and has recently received a fresh impetus at Osborne. The Army is reorganising its educational methods; engineers have their splendidly-equipped schools. The legal profession has recently been adding to its educational facilities, and with such success in the north of England that London is following suit, while educationalists themselves now realise that they must be taught to educate. What, then, of architecture? That its educational facilities are not considered wholly satisfactory seems to be proved by the existence of the Institute Committee upon Architectural Education, and we cannot but await with great interest the results of its deliberations.

It is precisely because this matter is *sub judice* that I venture to put before you this evening the plea that science should receive more consideration as suitable food for the architectural student, and allow me to add at once that this suggestion is not in the least at variance with the view that architecture is an art. There is, I believe, a section of the profession which looks upon science with a suspicious coldness, as being destructive of art, as slaying poetic visions with unromantic facts, and as necessarily supplanting a free and living curve with a parabola or an hyperbola. I venture to think that such a view is an unjust one. "Every work of art," says Ruskin, "either states a true thing or adorns a serviceable one," and science gives us both truth and service. If Nature herself is the highest art, he who would reproduce her must study natural laws. A painter from life profits by a knowledge of anatomy, similarly an architect will be more in harmony with his environment if he is conversant with the composition, physical properties, and past history of his materials. The materials would then be always selected suitably to the design, and thus science would become the handmaid and not the supplanter of art.

But however this aspect of science may be viewed, there are many direct applications of science to architecture as understood at the present day. Architects are no longer called upon to produce massive and utterly uncomfortable buildings, such as those of Vanbrugh's time. The modern building is full of complications, which, with the advances of science and extended demands for comfort, will increase, and when the contractor has ceased to be a builder will become more than ever the responsibility of the architect. The arrangements for drainage and water supply, ventilation, warming, and lighting, the selection of suitable materials and the display of judgment in dealing with the thousand and one patents brought forward by the building trades, the power of probing the worth of statements in favour of any materials by deciding upon, and being able to subsequently understand, the various chemical and physical tests to be applied to them, provide indeed a wide field, which, if inartistic, is admittedly within the province of the architect, is by no means devoid of interest or skilled work, and certainly requires the direct application of science.

Let us consider the effect of a *laissez faire* attitude upon these matters. A vast army of industrial workers, becoming every year better equipped in the principles of their trades, is producing novelties which are, broadly speaking, improvements in methods of construction, sanitation, and kindred branches of industry which depend upon the building trades for support. These new productions are, of course, put forward with the object of material gain to the makers, but at the same time they are the results of that spirit of emulation and progress which are the characteristics of active life, and are the outcome of the thought of specialists in individual lines. To the architect is offered the crowning position with regard to such industries; he is the court of appeal as to the success or failure of such advances. If he assumes an attitude of indifference must we wonder, and ought we to complain, that the tide, stemmed by his apathy, finds new outlets, and that the public place in other hands matters which should pass through his hands alone? It is true that the span of life does not increase with the increased burdens which the profession is called upon to bear. The suggestion that the individual should attempt to give judgment on the new products of every trade would be, of course, impracticable. This difficulty need not plunge us wholesale into specialisation, which, if carried too far, would lead to the destruction of the profession as such. It could largely be met by centralisation. The matter was touched upon in a paper read last year before the Association, and the establishment of a General Information Bureau in touch with the trades, for the collection of statistics, standardisation, and testing, would go far towards solving what must some day become a pressing question. This is so large a problem that I should be led away from my subject in pursuing it; but it is one which, should the collection of data lead to any practical suggestions, might be worthily discussed. In the meantime it is most gratifying to learn that the Institute is in communication with the director of the National Physical Laboratory with a view to arranging facilities for conducting tests on materials.

It is, of course, easy to generalise on such a topic as this, but to make such generalisations of any value it is essential that they should be supplemented by definite proposals as to courses in science and their bearing in detail upon architecture. Before going into these details, it may be of interest to see how far such work is found to be practicable and desirable in various teaching centres at the present time. For this purpose I have made inquiries from a number of institutions in this country and abroad, selecting as far as possible those of university rank. The results of this investigation are contained upon the diagram before you, and I should like to take the opportunity of thanking the professors and lecturers who have so kindly answered my inquiries, in some cases at considerable personal trouble. I am also indebted to the valuable papers of the late Mr. Cates and to the librarian of the Institute for his kindly advice upon several occasions. The centres were selected more or less at random, without any consideration for their predilections for science or the reverse, and the table would have been more complete had not my attempts to obtain details unfortunately proved abortive in more than one instance. The courses dealt with are ordinary architectural, and not engineering, courses, and the diagram shows the hours per week in the various years devoted to physics, chemistry, and geology, under which last heading I have included in one or two instances other branches of science, such as botany. It has not been an easy matter to bring the data collected into line, and I cannot guarantee the figures as absolutely accurate, but I believe they are sufficiently so to show the regard in which science is held at these institutions. While our courses in this country extend over not more than three years, those in America and Germany

extend usually over four years, and the total average given in the last column but one is taken on the four years basis for all. Both lecture-room and laboratory work (of which there is a fair proportion) in both pure and applied science are included in the hours given, but no allowance is made for the students' private reading. Under physics I have included such applications as courses on structure stresses, hygiene, and materials, but not courses on ordinary construction or on mathematics.

HOURS PER WEEK DEVOTED TO SCIENCE IN ARCHITECTURAL COURSES.

Years	Physics. 1	2	3	4	Chemistry. 1	2	3	4	Geology. 1	2	3	4	Total Average.	Possible % of Science Entrance Exam.
McGill	5	5	7	5	—	6	—	—	—	—	—	3½	7·9	20
University College	4	13	3	—	7	—	—	—	—	—	—	—	6·8	40
Glasgow Tech.	9	3	—	—	—	—	—	—	—	—	—	—	5·3	0
Bristol	4	6	2	—	4	—	—	—	—	—	—	—	4·0	—
King's College	5	1	½	—	6	—	—	—	—	—	—	—	3·1	—
Manchester	3	1	2	—	—	—	—	—	—	—	—	—	1·5	17
Liverpool	2½	3½	—	—	—	—	—	—	—	—	—	—	1·5	20
Illinois	—	12	3	2½	—	—	—	—	—	—	—	—	4·9	55
Massachusetts	—	5	3	4	—	2	—	—	—	—	—	—	3·5	—
Pennsylvania	3	2	4	—	—	—	—	—	—	—	—	—	3·3	—
Harvard	4	2	3	2	—	—	—	—	—	—	1	—	2·8	—
Columbia	1½	2	2	2	—	—	—	—	—	—	—	—	1·9	25
Dresden	2	5½	2	2½	3	—	—	—	—	3	—	—	4·5	—
Stuttgart	6½	—	1	3½	—	—	—	—	3½	1½	—	—	4·0	13
Charlottenburg	2	1½	2	2½	2	—	—	—	—	½	—	—	2·5	—
École Spéciale	1	2	—	—	1	1	—	—	1	—	—	—	1·5	—

If we assume that the teaching hours for a student average twenty-six per week, and that his course of training extends in all cases over four years, then the statistics before you will give the following as percentages of his total academic career devoted to science and its applications:—McGill University, 30½; University College, London, 26; Glasgow Technical College, 20½; University of Illinois, 19; Dresden Technischen Hochschule, 17; Bristol Merchant Venturers College, 15½; Stuttgart Technischen Hochschule, 15½; Massachusetts Technical Institute, 13½; University of Pennsylvania, 12½; King's College, London, 12; Harvard University, 10½; Technischen Hochschule, Charlottenburg, 9½; Columbia University, 7; Ecole Speciale d'Architectur, 6; Manchester School of Technology, 6; Liverpool University, 6. The omission of the courses of our Association from the above list is due to the different system adopted which makes a fair comparison impossible; the amount of time devoted to science will, however, be admitted as small.

Applications of Science to Architecture.

As showing the value of a training in the principles of science, I will now ask you to allow me to touch in detail upon some of the applications of science to architecture, and at the same time to forgive the necessarily disjointed character of what must be a rapid survey of a very large field.

Physics.—Physics deals with matter and energy, and, therefore, in its widest sense includes chemistry. In its generally accepted sense, however, it is taken to include dynamics (often called mechanics), acoustics, optics, heat, magnetism, and electricity, and we may shortly refer to its branches in this order. The application of the dynamics of solids to constructional work is too obvious to need any discussion, and forms a recognised part of all architectural courses. Lectures on this subject should always be experimental and supplemented by work in a mechanical and testing laboratory, which is the case in most institutions. The value of such a course may extend beyond mere construction—for example, a knowledge of the u e of a delicate balance and the appreciation of specific gravity might save a surveyor much time in the measurement of valuable and irregular sites. The dynamics of liquids and gases, on the other hand, generally receives but scant treatment. An architect has constantly to deal with problems involving water supply and the flow of water and drainage in pipes, he must not suggest a lift pump for a 35 ft. well, nor a water turbine without considering his loss of "head" by friction, and he must have an hydraulic ram up his sleeve for country houses blessed with a stream in their grounds. He cannot tackle these problems unless he has an elementary knowledge of the principles of hydrostatics and kinetics. Again, the dynamics of gases brings us to the important subject of ventilation. A knowledge of the relation between the pressure and volume of air, the relative weights of different gases and their expansion with rise of temperature (properly studied under heat) would render many ventilating problems intelligible and interesting, and sometimes point a way to the introduction of ventilation schemes at but little cost. Mechanical fans, now so much used, require more discretion in selection than they generally get, while the ducts and their bends for the passage of air require thought in planning to ensure success. The difficulty which sometimes arises in understanding why the heavy gas, carbon dioxide, produced by combustion and breathing, vitiates the air at the top of a room can be cleared up by two very simple experiments, which you will perhaps allow me to make as an indication of the way in which such a course may be illustrated.

Acoustics is of all the branches of physics the most difficult in its practical application, and probably a deep study of the subject would be of but little value to the architectural student. A knowledge of the velocity of sound in air and the conditions (chiefly depending upon temperature) under which this varies will however result in some notion as to the probable interference by reflection with the voice of a speaker, a consideration too often overlooked in public buildings; and in these days when we are herded together in flats and attached houses the conductivity of different materials for sound has become a highly important matter. Unfortunately, much research remains to be done upon the application of the laws of sound, but as experiments must be carried out on a large scale to be of value, they are naturally difficult and costly.

A knowledge of the laws of heat finds many applications in architecture. The amount of expansion of materials with rise of temperature is by no means always appreciated. The Forth Bridge, for example, is just about one yard longer in summer than it is in winter, owing to expansion, and though architects are not usually called upon to deal with such spans as this, the growing use of long steel joists renders the fixing of such joists often worthy of care. The great coefficient of expansion of lead, nearly three times that of steel, accounts in part for its "crawling" propensities. Joints of materials which expand unequally are never likely to remain sound. For this reason steel and concrete will make a much more permanent joint than steel and brickwork in mortar or cement. In this connection the mass, specific heat and conductivity of the materials must also be considered. Anyone can convince himself of the expansion of solids by making the simple experiment before you.

Upon the expansion of liquids depends the whole system of water circulation, and here I would venture to point out the hardship imposed upon good firms in tendering for hot water plant when the architect does no more than state the temperature to be exacted in the building to be heated, as it is then easy for an unscrupulous firm to give a low tender by subsequently supplying a boiler and furnace which will only give the required result by being worked in a detrimental manner with a forced draught, an easy thing to arrange if the system is ever tested. A rudimentary knowledge of the principles of heat would enable the architect to include in his specification, with but little trouble, sufficient detail to safeguard both client and contractor. A knowledge of the specific heat of materials and their conductivity is useful in problems of warming and fire risks. Again, the melting points of substances are often an indication of their purity. Good mastic, for example, melts at about 260 Fahr., but if it is adulterated with coal tar pitch it liquefies at a much lower temperature. Such an investigation could be made in a few minutes with the aid of a test tube and a thermometer.

Perhaps the study of optics has less bearing upon an architect's work than other branches of physics, but a knowledge of the laws of illumination would help him to arrange his lights, and the principles of dispersion are of value for the understanding of colour problems. The comparison of the power of different lights is sometimes useful, and for approximate purposes can generally be ascertained after a moment's calculation with the aid of no more apparatus than a foot rule and a stick.

Turning to magnetism and electricity, every architect carries a compass, and a little knowledge of terrestrial magnetism will prevent him from overlooking the difference between the magnetic and astronomical north when setting out his buildings. Electricity, although it has few indirect applications to architecture, is itself of such direct importance that no apology is needed for putting forward its claims in this paper. It is not possible for an architect intelligently to supervise the electric lighting and power arrangements in a building without some knowledge of the principles of this science. It may be said that he is safeguarded by fire insurance regulations, but he does not always see that these regulations are complied with, and the insurance companies must take much of the work on faith. To an unobservant eye all wiring work appears much the same, and although it is on the whole exceedingly good considering the immunity with which it is usually carried out, yet when prices are obtained in competition the contractor would be more than human did he never profit by this independence. Although I am far from wishing to impute this as a general thing, I know at least one firm with a very high reputation which makes a practice of giving its foreman a commission upon what can be saved in carrying out wiring contracts, which appears to me to be a direct incentive to a bad class of work. The trade in electrical sundries is now an enormous one, and some firms abroad who send goods to this country have regular grades of fittings showing a carefully-arranged deterioration from the first samples submitted, with the result that there is always a great deal of rubbish on the market, and foreign countries are careful to arrange that such goods do not return by imposing a heavy import duty. I have here a few specimens of good and bad switches, etc., kindly collected for me by the General Electric Company, of Queen Victoria-street, E.C. How instructive would a museum arranged on these lines for all the trades prove to the student!

Chemistry.—Though chemistry has less bearing upon architecture than has physics, the general principles of the science are essential to anyone who would really understand materials. It is often supposed that chemistry is confined to problems of analysis, and I believe people still exist who would dispose of chemists as men who serve in shops and men who analyse minerals and foods. The attitude of this country towards science has not made it possible for the public to realise that the most valuable work in any of its branches is not the mechanical repetition of known processes, but the broadening of the foundations by research, which alone can supply the nursery for useful applications. Chemistry enables us to tell beforehand the changes which are likely to take place in bodies in varying circumstances, and therefore to employ materials suitable to their environment and to know how to set about remedying defects which have arisen through neglect of such precautions.

In the selection of a building stone a knowledge of its composition and physical structure is of great value. The weathering of stone owing to its absorption of water from the atmosphere and the subsequent freezing of this water depends, as is well known, largely upon its porosity and power of cohesion. Water expands by nearly one-twelfth of its bulk on freezing, and though it may be confined, it will still freeze and force the particles of the stone out of place to find room for expansion. A substance would require a cohesive force of about 10,000 lb. per square inch to prevent confined water within it freezing when subjected to only ten degrees of frost F°.

To illustrate this point I am freezing some water inclosed in a steel bottle, which I hope to show you has been burst in the process.

This expansion of water is, of course, a purely physical action, but the power of ordinary water in producing chemical changes is no less

important. It has been said that no one has ever yet seen pure water; ordinarily it may be considered as a weak solution of carbonic acid, and has considerable solvent action upon many stones consisting of carbonate of lime—even marble is not proof against its attacks. A case is cited of a marble monument in Gray Friars churchyard which decayed to a depth of a quarter of an inch in sixteen years through the action of the atmosphere and water, but this is, of course, a very extreme instance. That carbonate of lime is soluble in water containing carbonic acid gas can easily be demonstrated.

Iron pyrites, which is almost always present in coal, produces on combustion a gas which in our moist atmosphere is rapidly converted into sulphuric acid. Coal contains about 1 per cent. of sulphur, which on combustion produces eventually some 67 lb. of sulphuric acid per ton of coal. Probably quite 16 million tons of coal are annually burnt in Greater London, and if the whole of the sulphuric acid produced descends upon us in rain and fog, we are annually refreshed, therefore, with some 500,000 tons of this corrosive liquid. Not only does this acid attack stone more violently than does carbonic acid, but it forms compounds in the stone which occupy more space than the original particles, so that the effects are much like those produced by frost. Silica, of which many sandstones are almost entirely composed, is, on the other hand, entirely unacted upon by any atmospheric acids, and therefore a closely-grained sandstone is usually very durable. Rather curiously, an instance has been cited of a defaced monument of sandstone in the same churchyard of Gray Friars on which the marks of a chisel are visible after more than 200 years. A repetition of the last experiment, substituting silica for carbonate of lime, will demonstrate this difference in solubility.

The action of water upon lead on account of the poisonous nature of lead compounds should be considered in arranging a soft water service. In the presence of nitrates, often found in potable waters, the action of the water upon lead is quite considerable even after a short period. Finally, as regards water, a water analysis is a first essential in the selection of a country site, and the architect should be able to understand the analyst's report and to advise his client thereon.

As regards other materials used in building, in slates are found two forms of iron sulphide, one of which disintegrates on exposure, while the other is permanent, and therefore harmless. The presence of free lime—that is, calcium oxide—in bricks, which is sure to cause disintegration, is very easily detected chemically, and where facing bricks are used in important work I would go as far as to suggest that the brickmaker should furnish an analysis of the coal used for firing with a view to guarding against that distressing malady, so difficult to cure, efflorescence in brickwork.

The important subject of limes, mortars, and cements cannot be understood without a knowledge of chemistry. If analyses of these materials were more generally demanded by architects we should hear much less of bad and bulging plaster, friable mortar, and the upheaval of cement floors. The strength of cementing materials should be apportioned to that of the bricks. It is mere waste of money, for example, to build in cement some of the miserable slack-baked London stocks which too often find their way into good-class buildings. Anything under the name of Portland cement generally passes unchallenged, and although adulteration is fortunately rare in this country, ragstone is sometimes added, but can easily be detected under the microscope. Blue lias lime and Portland cement often exhaust an architect's category as regards cementing materials, whereas selenitic mortars, which allow a large proportion of sand, might often be used with economy. Selenitic limes are used chiefly for plasters, but in dry situations deserve an extended use for mortars. Tests made in France indicate that the strength of Portland cement is increased by making it selenitic, *i.e.*, by the addition of sulphate of lime, but the careful tests of the British Committee on Cements do not confirm this view. The addition of sulphate of lime, however, to ordinary limes appears to produce a considerable increase in strength. Mr. Redgrave cites tests which show that selenitic mortar has about five times the strength under compression that similar non-selenitic mortar possesses, and the tests recorded by the same writer, carried on during the building of the Law Courts, indicate that between brickwork Messrs. Nelson's selenitised lias lime used 1 to 5 was more than twice as strong as ordinary lias lime 1 to 3. If these tests can be relied upon, a remarkable financial saving should be effected by following the precedent set by Mr. Street. The lime and sand for a rod of brickwork in ordinary blue lias 1 to 3 is worth about 40s. and in selenitic lias 1 to 5, about 30s., but if this latter is really twice as strong as the former it is not merely one quarter, but more than two and a half times cheaper. Were cementing materials sold by strength and not by weight, such points as these would receive more general attention. The breaking strain of a briquette of cement without a knowledge of its chemical composition is often of little value. A cement, for example, containing an excess of lime will come out of test with flying colours, but it is most dangerous to use as it is liable to disintegrate, when, of course, its cementing power is practically nil. Again, if a cement contains much iron, sodium, or potassium, it is almost certainly underburnt, as in this case it could not have been raised to the proper temperature without partially fusing in the process. Messrs. Nelson and Company, of Rugby, have been good enough to prepare a number of briquettes of varying composition. The testing machine before you is made and kindly lent by Messrs. Faija, of Old Queen-street, Westminster.

The preservation of the metals used in building is often largely dependent upon the substances with which they are in contact. A very small knowledge of electricity and chemistry would point out the extravagance of using any but the purest zinc in a moist atmosphere, and the rapid corrosion which must take place when this metal is left in contact with carbon (as soot or coke, for example), or with copper, iron, or lead. The electro-negative character of zinc again renders it open to be acted upon by lime, and therefore to decay in contact with mortar or cement. The oxidation of iron, for similar electrical reasons, takes place in a moist atmosphere with increasing rapidity after the formation of the first film of oxide. The quality of iron, as, for example, the difference between grey and white cast iron, would be appreciated by a very brief study of the metallurgy of iron and steel.

Turning to timber, the important subject of the impregnation of wood, either for its preservation from decay or against fire, is largely a chemical question, while the compounds contained in wood, such as gallic acid in oak, forming as it does an ink in contact with iron, have often to be taken into account.

The trade of the painter yields a profitable field for chemical inquiry. Though we specify white lead, prepared by the old Dutch process and well matured, we are not in the habit of seeing that we get it. Second quality paints are manufactured on quite a large scale and sold as such; they contain as a substitute for the greater part of the white lead, barytes, chalk, or sometimes other bodies, and these are quite inferior in covering and binding power. Barytes, being a heavy mineral, is the most suitable adulterant from the point of view of the vendor. Such paints are easily distinguished by merely treating them with nitric acid if in powder, or if, as would more usually be the case, mixed in oil, without the aid of anything further than a wooden match, a piece of washing soda, and a sixpence, as we will show. Further, if such inferior paints are carefully weighed, then heated and weighed again, they will be found to lose much less in weight than would a good lead paint, which contains a considerable proportion of combined water capable of removal on heating. If paints with a white lead base are used in a sulphurous atmosphere, such as that of a chemical laboratory, or where bad coal gas is much burnt, they rapidly blacken owing to the formation of sulphide of lead. In such cases zinc white should replace white lead, and for light greens or yellows real chrome green and cadmium yellow. As these paints are more expensive, and have to be employed in larger quantity for the same covering effect, they are often adulterated with white lead. This again may be detected with the aid of a mouth blowpipe and a piece of charcoal in two or three minutes without resorting to a professional analyst. Similarly the value of black paint, which should always have a base of white lead if it is to protect the material covered, may be ascertained. In case a blowpipe and charcoal seem to be outside the range of architectural routine, perhaps I may be allowed to repeat the experiment substituting for them paper and pencil.

I am indebted to the Architectural Association and to Messrs. George and Company, of Hatton Wall, E.C., for the loan of the apparatus used in these experiments.

I will not try your patience by entering further into the applications to architecture of these three sciences which I have selected for illustration, but in referring to geology will content myself by pointing out its great value as indicating the localities and sometimes the probable quantities of various building stones and their planes of stratification or bedding. Not less valuable is some knowledge of this science when the choice of a site, both from the point of view of health and the stability of the building, is in question. In the matter of well-sinking much needless expense has been often saved, and superstitious practices averted, by a little knowledge of the strata of the neighbourhood.

With a view to obtaining some idea of the amount of existing scientific literature useful to architects, I have during the last few months visited the libraries of the British, South Kensington, and Jermyn-street Museums, also those of the Chemical and the Geological Society and the Patent Office, besides that in which we are here privileged to meet, and certainly that of the Patent Office should be placed first, taking the size of the collection, its accessibility, and excellent arrangement into account. While text-books on pure science leading up to its applications in architectural work seem to be non-existent, works on the applications themselves are, of course, very numerous, particularly as far as physics is concerned. Chemistry, although touched upon incidentally in many books, is exceedingly scarce in the field we are discussing, and I have only found in these seven libraries six small books dealing with the chemistry of building materials. Of these the most important and suggestive are reprints of the courses of lectures given on this subject at the School of Military Engineering, Chatham, copies of which are not easy to obtain. While no general handbook on geology written for the architect seems to exist, several useful works on building stones may be consulted, and perhaps special mention should be made of the little Survey publication on sites in London, with its geological map, which can be purchased at the Jermyn-street Museum.

On the supposition that some knowledge of science is desirable for an architect, let us turn, in conclusion, to the practical means for attaining this knowledge. Many valuable courses dealing with the applications of science in the manner I have endeavoured to indicate already exist, though in some cases they are very curtailed; but the chief point which I wish to make in this paper is this—*that unless some previous knowledge of the principles of science is insisted upon, such courses cannot be properly appreciated, and the time spent upon them must be largely thrown away.*

I would venture to suggest that a passage through the following courses should form part of the requirements of an architectural student on the outset of his career:—

(1) A general experimental course on physics, including laboratory work and dealing with the dynamics of solids and fluids, with heat, magnetism, and electricity, and very briefly with acoustics and optics.

(2) A similar course dealing with the elements of inorganic chemistry, touching upon principles, but chiefly of a descriptive character. Mere analysis to be subordinated to simple quantitative work and the preparation of important compounds. The illustrations of chemical laws being based as far as possible upon those substances which would afterwards figure in a course of applied chemistry.

(3) A short course outlining the principles of geology, and dealing with the stratigraphical arrangement of rocks and with petrology, rather than with palæontology, and aided by the examination of museum specimens, such as the collection of building stones in the Jermyn-street Museum and by occasional visits to quarries.

The whole of the above work, in the simple form in which I have it in view, might be undertaken by a person of average intelligence at the age of, say, sixteen, and completed in one year with some twelve hours' teaching per week. This means the devotion of about half a year to pure science, and when a student starts his career early, and has no prospect of practising at the end of three or four years, which is generally the case, such time spent on science

ought by no means to be grudged. In the case of older students such knowledge might well be demanded of them upon entrance to their studies, since the facilities for teaching science at our public schools could at the present time easily meet such requirements.

I am sure that the help and encouragement to those engaged in lecturing to more advanced students upon the applications of science would be enormous were such preliminary courses insisted upon, and we might hope that these courses upon applied science would themselves grow under these more favourable conditions, but were this impossible, at least much more could be done in the time at disposal.

It would ill become me as a return for your invitation to read this paper, and as such a newcomer into the ranks of this Association, to criticise its educational work. Yet may I be allowed to put the question whether science is sufficiently considered in our curriculum? The Association, with its large roll of eminent members so strikingly in touch with the educational well-being of the profession, occupies a commanding position, and under the new conditions just entered upon cannot fail to attract the attention of all other teaching centres. Do our facilities for teaching the science of architecture compare favourably with those of other institutions? Is it a sign of progress that a course once held upon the chemistry of materials has, for more than ten years, ceased to exist, and that we have nothing in the nature of a laboratory? I am aware that the courses given must be largely governed by the Institute examinations. May we hope that, as the result of the deliberations of the Institute Committee on Architectural Education, science may figure more largely in the preliminary if not in the subsequent examinations? A glance at the requirements of foreign universities show how much more encouragement is given to science than is to be found here. Cornell, for example, recommends chemistry, physics, geology, and a modern language as the subjects for the entrance examination to its architectural courses, and in the final examination for the French diploma the candidate must pass an oral test in applied chemistry, physics, and geology. Lastly, considering the large and varied field in which an architect is called upon to work, would it not be possible to allow a student, within properly restricted limits, to develop along lines best suited to his abilities by the introduction of one or two alternative subjects into his later examinations?

[Several interesting experiments were successfully carried out by the lecturer during the evening.]

In the discussion which followed, Mr. H. Stannus, in proposing a vote of thanks, said they were much indebted to Mr. Munby for his experiments and for the trouble he had taken in preparing his paper. He agreed with the point of view Mr. Munby had been making all through the paper, and he took it that Mr. Munby desired them not so much to criticise or to approve of his experiments *qua* experiments, but rather to consider the place of science in an architectural curriculum. All of them would agree that the more science—the more knowledge—they could have the better, but there was a danger of laying too much stress on or of trusting too much to science. It had become a byword that when science came in at the door art flew out of the window, but he would not go so far as that himself. But he would say this: science was a good servant to an architect, but a very bad master; or, as Mr. Munby put it, it was a good handmaid, but a poor master. What architects needed was a scientific method of dealing with the subjects taught in an architectural curriculum, the student being taught that there was an underlying science in the matters he learnt. Mr. Munby had pleaded for a great deal of science, and he (the speaker) agreed with him; but after all, the teaching of science in an architectural curriculum must bear some proportion to the other subjects. No education in architecture could be looked upon as final; the best that could be done was to enable a student to educate himself, for it was when a man began to face the actual problems that his education might be said to begin. Mr. Munby spoke of one year for the teaching of science. Would it not be better not to give too much science at once, and to spread it over, say, three years? If a young architect was set to learn a lot of science before he began his architectural course, he did not take the interest in it, or see the value of it, and, therefore, it would not be so beneficial to him as if he took the course of science at the same time as he went through his particular subjects. Tastes varied, and a man would assimilate that for which he had a taste, and, that being so, there would always be different kinds of architects.

Mr. H. D. Searles-Wood, in seconding the vote of thanks, said he thought that the whole point of the paper was as to the value of science as a mental training for an architect. The student should acquire his knowledge of pure science before he entered on his architectural training. All must agree that architects could have only a very elementary acquaintance with the sciences, and, while it was interesting to see Mr. Munby perform his experiments with such facility, they all knew that the great majority of architects would, if in performing the necessary experiments they went a little bit off the line, be absolutely at sea. If architects had sufficient knowledge to know their own limitations, and if they had enough elementary knowledge to enable them to follow a paper like Mr. Munby's, it would be well. The correct title of the little Survey publication referred to by Mr. Munby was "Soils and Sub-soils in Regard to London," by Dr. Woodward, and it was a most valuable paper. He thought it would be a good thing if the Secretaries of the Association wrote to the Geological Society and asked them for a list of the valuable papers on petrology which had been contributed to their journal. At the Jermyn-street Museum, not only had they a very valuable collection of building stones, but they also had valuable papers on matters connected with the building trades—memoirs on brick-earths, etc. He thought that the Association might write to the Museum authorities and state what the needs of the Association students were, and he felt sure that the Museum would be happy to supply lists of papers on subjects of interest and importance to students. He did not think it would be worth while for a geologist to write a book on geology for the architect. There was a book on engineering geology by W. H. Penning which was equally useful for architects, and the Americans had some useful books on the subject. As to a little knowledge being a dangerous thing, a geological map was sometimes made use of, but if an architect trusted to that he might easily go astray. A little more knowledge, however, as to the sub-soil would be of great interest and value.

Mr. A. Maryon Watson, B.A., in supporting the vote of thanks, said that Mr. Munby had moderately stated the claims of science to a place in an architectural curriculum, and everyone was agreed that what was wanted was scientific method. If we could learn to observe accurately, and to make correct deductions from our observations, that would be an important advantage. It would be sufficient for the architect if he were able to appreciate and explain the analysis of the purely scientific man—the chemist or the physicist, for instance. Mr. Aston Webb had lately reminded them that it would be the ideal for architects to try to know something of everything and everything of something, and that was a sufficiently high ideal to put before one. There was a great danger of architects undertaking to hold themselves out as specially scientific men. The responsibility was already sufficiently great when an architect gave his final certificate and certified that the client had got what he paid for, but if an architect had to go about with a test tube, etc., and test scientifically all the materials, he would not only have to test the first samples, but all the consignments of the goods. There was the good switch, for instance, and less good switches, and they would all have to be tested. Again, if one carried out a scientific test with the first bushel of Portland cement, one could not conscientiously certify at the end of the work unless every bushel had been tested. It was important to have a good method of reasoning about these things, and to draw a clear line between what was the architect's province and what was the province of the specialist. If a client wanted a chemical analysis of the materials in his building, the right thing for the architect to do would be to say that he could not do that himself, and that the client must go to an analyst. Mr. Munby seemed to suggest that an architect should advise as to the analysis of the water on an estate, but it was just there, surely, that the architect should retire and recommend the client to consult his medical adviser. He agreed with the greater part of Mr. Munby's paper, but he could not go quite as far as the lecturer.

Mr. F. R. Farrow also supported the vote of thanks. Mr. Munby had admirably shown one great advantage of scientific training and knowledge to the architect—one aspect of the value of scientific knowledge to the architect; but there was another view which appealed to him (the speaker) quite as strongly. Mr. Munby had emphasised particularly the value of science in helping an architect in matters connected with building, but he (the speaker) was inclined to view as of equal, if not greater, importance the value of science as a mental training for an architect. Mr. Munby had suggested that perhaps science and art were not on the most friendly terms, but he (the speaker) was inclined to think that scientific training was one of the best means of enabling the architectural student with artistic ability to make such a position in the world as would enable him to exercise his artistic ability to the greatest advantage to himself and his art. The architect-members of the Royal Academy were not only artists, but they were also first-rate men of business, and science was one of the best means of training a man in those qualities which go to make a good man of business. From this point of view he thought it would be a good thing to include pure science in the Association curriculum. There was a great deal for an architect to learn, but a place ought to be found in the curriculum for pure science, if only on account of the mental training he had referred to. Besides, architects would find it useful in their everyday work to have scientific knowledge of materials, in order to understand the value, etc., of the analysis of materials brought to their notice by merchants and others. There was great pleasure, also, to be derived from the study of science. Most of those who had had an architectural training either possessed or imbibed a certain amount of imagination, and that quality, when allied to science, enabled one to make discoveries which were not to be found in the text-books. In experimenting with lime in the Association classrooms he had made some discoveries which were not to be found in the text-books. In short, science was valuable to an architect as an equipment in his business, and it was valuable to an architectural student as a mental training in those qualities which would enable him to give his art full scope—which meant, of course, getting work. It was little use being a man of high artistic ability unless one could use that ability to the advantage of oneself and the world.

Mr. Max Clarke said that Mr. Munby suggested that science should have a greater proportion of time in the curriculum of the Association. At the lectures he (the speaker) had given from time to time the students seemed to complain that their time was already too much occupied, and if more time were given to science that would have to be deducted from other studies. He had come to the conclusion, based on what he had heard students say, that to carry out architectural education properly young people should not go into architects' offices to commence with. Students complained that the time given to office work left no opportunity for work in the curriculum of the Association. As to science in connexion with architecture, he took it that a certain amount of science was absolutely necessary. Where the scientific instruction in the curriculum of the Association should stop was a matter for the Association. In the lectures on hygiene he was allowed, as lecturer, twelve hours per annum to explain all about lighting, heating, ventilation, and kindred matters, and he found that the task was such an impossible one that he did not intend to attempt it in the future. No doubt Mr. Munby was correct in his main point—a man ought to have a certain amount of scientific knowledge, and he ought to get it while young, and not when he was entering into his third or fourth year of study. That was not the time to begin to learn about acoustics, light and heat, etc., on which so many students were absolutely ignorant. Students should learn these things either before they commenced architectural study at all, or else they should take those subjects at the commencement of the curriculum.

The Chairman, in putting the vote of thanks, said the paper was a unique one in its way, and he did not remember having heard one in that room touching on the same ground as Mr. Munby had done. They must all agree with Mr. Munby that a certain amount of

scientific education was very desirable, and almost necessary now, in the curriculum of education for an architect, but what was really necessary first was that the grounding of this scientific education should be given at school before a boy thought of becoming an architect or anything else. One of the complaints of all the teachers of the Association was that the majority of young fellows who went into the classes were imperfectly educated, and were not in a position to take advantage of the teaching. He hoped and believed that that would become less and less the case; the care for the education at the schools was becoming more systematised, and a great deal more attention was being given to secondary education than up to now had been the case. He believed that students who entered the Day school now were better equipped than some of those the Association had had in the evening school, for instance. One remark Mr. Munby made which seemed to have a great deal in it was as to the samples, and he said it might be a good thing if the Association had samples in order that the students could judge of the relative merits of things. It seemed to him (the speaker) that it would be useful to have a sort of museum of good and bad materials and manufactures, which need not be extensive, and which would illustrate good and bad qualities of goods. That would be of use to students and others, and might be worth doing.

The vote of thanks having been heartily agreed to,

Mr. Munby, in reply, said that he meant that the science suggested for a student should be given at the commencement of his career, and should be pure science, which should form the groundwork of his education. The applications of science should come year by year as they were wanted, but if the groundwork of elementary science was not there it would be very difficult for the applications to be taught and for the whole work to be done in the time at disposal. For example, in a course on the application of the laws of heat, it would be very difficult to get in the work in the respective years if no knowledge of the science of heat had been obtained previously. As to geology, if the Geological Society could be induced to give the Association information as to sites from the architectural point of view, it would be very valuable indeed. He did not agree with Mr. Searles-Wood that it would not be worth while for a geologist to publish a book on geology for architects. A little book on the subject would possibly be read, whereas a busy architect would not take up the study of geology if he thought he would have to wade through the branches of the science not dealing with his work. What Mr. Watson said about testing sounded too severe. Everything that came on to a site need not be tested, for if the contractor knew that the architect made any tests it would be sufficient to make him supply good material, and the contractor would be far more likely to do this when he knew that an architect was able to analyse his materials. A merchant would not run the risk of having his goods condemned by sending in inferior material after one or two tests had been made. As to water analysis, he never intended to convey the impression that an architect should be able to advise his client entirely upon the analysis of water, but almost every educated person ought to know enough about water analysis to understand results. A little knowledge of this subject in quite general terms would be of great value to an architect, as it was necessary when a country site was being selected to know what kind of water was to be had from a well, especially if it was near a churchyard or drainage. It was a matter of taste whether science was a pleasure or not. Scientific study could form a nice recreation, and, for his part, he could not see much difficulty in the way of an architect having a few pieces of apparatus with which to make occasional tests, nor did he think that that would require much time, and he would even like to see every architect have a little laboratory attached to his office. He strongly agreed with the Chairman that elementary scientific work should be done at the schools. It should be the aim to impart such knowledge before a student started architectural work at all. Usually a student did not commence architecture before he was sixteen, and he was not too young even then to have had some elementary scientific instruction. What the Chairman said as to the schools seeing that scientific knowledge was given was perfectly true, and a great deal of science work, he might say, was done at schools. But what had to be remembered was that nearly all school work was governed by public examinations to a large extent. If the Institute of Architects did not intend to have more than the present miserable bit of physics in its Preliminary examination, it was not likely that the schools would trouble to teach more to those who thought of taking up architecture; and it rested with the Institute and such bodies, as to how much science was taught to students before they entered professional classes.

The meeting then terminated.

OPENING OF THE NEW PREMISES.

ON Tuesday afternoon the President and Committee of the Association held their first reception in the new premises at 18, Tufton-street, Westminster. Among those present were:—Mr. Aston Webb, R.A., Mr. H. L. Florence, Mr. E. T. Hall, Mr. A. W. Pite, Mr. J. P. Seddon, Mr. Seth Smith, Mr. Cole Adams, Mr. Blashill, and Mr. Alex. Graham.

Mr. H. T. Hare, the President, in a short speech, referred to the enormous increase in the work of the Association during the past few years and to the advantages for future progress gained by the occupation of the new premises and the acquisition of the valuable collection of casts in the museum. Reference was made to the debt (amounting to 5,347*l.* 18s. 2d.) which is still due on the building fund and the hope was expressed that the profession generally would do its utmost to reduce this debt.

Mr. Aston Webb, on behalf of the Royal Institute of British Architects, wished the Architectural Association Godspeed in its new venture; the offer of the museum premises had arrived at a time when the Committee were at their wits' end to find a suitable site or building. Mr. Webb referred to the recently-formed Education Committee of the Institute, and hoped that the Association would support it in carrying out the unified scheme for the good of the profession.

Mr. J. P. Seddon expressed pleasure and satisfaction at the consummation of the work, and said how thankful the museum authorities were that the museum will be of such great use to architecture.

The work is not yet completed, and there is still something to be done ere the school can be in comfortable working order, but all the classrooms and studios are now ready for occupation. It is a matter of the greatest value to architectural education in the country that the Architectural Association is at last housed in premises befitting its position as an educational body. Congratulations are due to all those through whose agency the new premises have been acquired and established and to the architect, Mr. Leonard Stokes, for the success with which he has added to and remodelled the old building to embody all the requirements of a school of architecture. The addition includes the library and Secretary's office and part of the classrooms and studios. The alteration to the galleries of the museum supplies all floors with perfect natural light, and for every study a large arc lamp over the middle of the well is provided, supplemented by electric lights. As soon as the casts have been replaced students will have galleries in which their work can be conducted under the most rosy conditions. We understand that a special committee of selection and classification will proceed, as soon as the workmen are clear of the building, to classify and group the various casts now carefully stored away. The necessity for careful classification cannot be too strongly urged in the interests of the students, as there is nothing so fatal to study as the confusion which has existed, and still exists, in many of the cast-rooms of our museums. With so much space at their disposal, the committee should endeavour to group the different sections in chronological order so that the student can readily grasp the historical progression of the styles, and thus provide himself with a visible sequence to guide his work in the studio and lecture-room. Entering from the entrance hall is the general office and library, beyond which is the Secretary's private office and Committee room. A common reading-room for members is placed near the entrance, while a refreshment room with scullery and cooking stove is provided off the museum, where students can be supplied with hot lunches and teas. Lavatories for both sexes are provided, and in the basement is accommodation for bicycles. A main staircase has been introduced to the galleries, and from there access is obtained to the studios and class-rooms. On the first floor are two classrooms with sliding partition which can be converted into a large room for general meetings. These classrooms are provided with abundant cupboard accommodation and an elaborate system of electric lighting. The lecturer is provided with a system of roller webs for diagrams behind the platform, which can be dropped and raised at will during demonstration, and for which special ceiling lights are provided. A master's room and dark-room for the camera club are also on this floor. On the second floor are two studios specially fitted, one with an arc lamp for modelling class, a cloak-room, lavatories, and water-closets. On the third floor are the studios for day students. These are entirely new, and are lighted from the roof. The building is heated by low pressure hot water throughout, and all classrooms are lofty and well ventilated. The new woodwork is throughout American basswood unpainted. Besides the satisfaction of having premises which are sufficient for all working necessities, it is gratifying to know that they are also excellently adapted for the social gatherings of the Association. The alterations were carried out by Messrs. Holloway Bros., and the Association is indebted for the consideration shown in the glazed tile work by Mr. Van Straaten, in granite work by Messrs. Cooper, Wettern, and Co., in sanitary fittings by Messrs. Bolding, in heating and ventilating work by Messrs. J. Jones & Sons.

THE SAVOY HOTEL EXTENSION.

THE extension to the Savoy Hotel is nearing completion. The principal façade is now that to the Strand; on the ground floor it includes Simpson's restaurant and shops. The main conception is fine, and is characteristic of the work of Mr. T. E. Collcutt, the architect. The material, a soft warm grey terra-cotta, is happily chosen and is suitable to the delicate detail—perhaps too small in parts—of the freely-treated Renaissance front. The ground story, which includes a mezzanine, is carried up to a corbelled balcony of some projection, from which arise the angle bays treated in the upper stories as circular turrets, and also two central bay windows carried up four stories. A richly-bracketed cornice crowns these, over which is an attic story below the springing of a steeply-pitched roof, in which are two stories, and which is covered with glazed green Spanish tiles. Striking and original as some of the lower design is, the whole proportion of the front is not convincingly successful. The wide carriage-way leads under a bridge to the covered forecourt. The bridge is a charming feature, over which can be seen the façade of the inner block, which unfortunately is only partly visible from the street. The design of this façade is quiet and pleasing. Emphasis is given to the upper stories by an arched colonnade decorated with figure sculpture, and capped by a beautifully designed cornice, over which the green corrugations of the Spanish roofing tiles are gay and charming. It is unfortunate that some such treatment as this was not possible to the Strand front. The lower story of this block under the covered way is treated with green and grey marble rustication with Doric columns, having caps and bases of bronze. Inside, the hall is decorated with a beautiful plaster frieze, by Mr. Pegram, over panelling of well-selected figured Spanish mahogany, the cornice of which is carried round the great arch leading to the foyer, to the detriment—we think—of the arch. Square marble piers carry the beams of a coffered plaster ceiling. A marble stair leads down to the foyer, which is a square hall decorated by white panelling in the intercolumnar spaces between marble columns, which carry an entablature. The effect is dwarfed by a very heavy coved plaster ceiling. The Parisian Café, entered from the entrance hall, is treated in Louis XVth style painted white, the ornament being executed in fibrous plaster.

Simpson's Restaurant is entered from the Strand. The gentlemen's dining-room is panelled in fumed Hungarian oak with inlay, which does not add to the beauty of the design. The mantelpiece is a dignified feature, in which polished Sycamore columns have been used with fine effect. The plaster frieze and ceiling is not satisfactory. The ladies' dining-room is decorated in the Adam style. In the smoke-room is a freize and ceiling by Mr. Bankhart, which is the most interesting plaster work in the building. The freize consists of a

series of band ornament of fruit and foliage, and the ceiling is divided into panels by a charming low relief leaf enrichment.

Six wrought iron balconies have been fixed in the south block, of the early Georgian period. The pair of wrought gates, with copper tablets, at Simpson's entrance, and the balcony which extends along the main cornice in the Strand, and returns to the courtyard, will be continued in the western block, which will be roofed in next month. A wrought iron balcony is placed outside the Parisian Café, and some big window grilles in Somerset-street at the back, the whole being designed by the architect, and made by Messrs. Starkie Gardner and Co., of Lambeth.

An "Otis" electric elevator installation has been provided. The electric elevator service (apart from the Otis hydraulic elevator installation in the old hotel block) will comprise seven electric passenger elevators, four freight elevators, and ten service elevators. All the elevators are magnetically controlled; the passenger and freight elevators from the car only, and the service elevators from the kitchen or main distributing floor. The car speed of the passenger elevators is about 300 ft. per minute (in one case 400 ft.). The passenger elevators have a lifting capacity in most instances of fourteen persons. The magnetic control device is actuated in each case by a lever handle switch in the car. The two-speed device permits of the car being started from a floor on the slow speed, until it has travelled a few feet, and being put back again to the slow speed when the car approaches the floor at which it is to be stopped. If the car is required to make only a short trip, or passengers prefer the slower speed, the car can be run at slow speed for its entire journey. A secondary or emergency switch is also provided in each passenger car. The car is immediately arrested and firmly locked to the steel guides or runners in the event of overloading, breakage of a lifting cable, excessive downward speed from any cause, whether ropes are broken or intact, or undue stretching of a lifting cable. The landing gates or doors to each lift are provided with safety fittings to prevent the car being taken away from a floor with gate left open or a gate or door being opened unless the car is at the same floor level.

The drainage and plumbing system at the new buildings is by Messrs. Doulton and Co., Lambeth, under the direction, and according to the plans, of Mr. J. R. Anderson, A.M.Inst.C.E., Engineer to the London Sanitary Protection Association. The underground drainage is of cast iron, the greater part being visible, and on the basement walls, or suspended below concrete floors, with iron inspection manholes, and access doors, with bolted covers, wherever necessary. The soil and ventilating pipes are all of 10 lb. hydraulic-drawn lead; and, in view of the height of the building, precaution has been taken to make the main anti-siphonage pipes 3 in. internal diameter. The main wastes for baths and lavatories are of 3 in. galvanised wrought iron tubing, and each branch waste, as well as each main waste, is provided with a special form of gun-metal expansion joint, to guard against fracture following expansion and contraction through the use of hot water. All disconnected wastes are also provided with ventilators, which, instead of being carried out through external walls, under or near window openings, are taken up above the roof line by means of special ventilating pipes. The hotel has its own water supply from a newly-sunk artesian boring, and storage capacity equal to 50,000 gallons is provided on the roof by means of a series of tanks coupled up to form one complete reservoir. As to the water service pipes, provision has been made for shutting off every fitting singly, or any particular floor or lavatory apartment. Meters are also introduced on many of the water service mains. The baths are of cast iron, white vitreous enamelled inside and out, with a wide rolled edge, and solid base; the front and side are extended to the wall. The fittings are of a screw-down pattern, with a removable standing waste, the supplies to valves being exposed, the whole of the arrangement being plated. A feature is the shower, one being provided with each bath, and actuated by a Doulton's patent mixing valve. The valve gives water at any required temperature, but it is so manufactured that hot water cannot be turned on first. To prevent splashing a hinged glass door is fixed with each bath. The lavatories are in polished statuary marble, with 18 in. skirting and an 8 in. frieze, and supported on shaped white metal legs. In the public rooms, both for ladies and gentlemen, the lavatories are fixed in ranges, and in the gentlemen's retiring-rooms Doulton's "Aldwych" pattern urinals are fitted. For the staff, spray baths are also supplied.

Messrs. Dixon and Corbitt and R. S. Newall and Co., Ltd., supplied the lightning conductors to the hotel.

THE ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.

A two days' meeting of the members of the Association of Municipal and County Engineers, arranged by the Northern Counties District, was held at Newcastle-on-Tyne on Friday and Saturday, May 6 and 7.

The opening day's proceedings were devoted to an inspection of the reservoir which is being constructed by Messrs. Hawkesley, as engineers, for the Newcastle and Gateshead Water Company, in the Upper Redesdale Valley at Catcleugh. The works are of great magnitude, and have been in progress since 1900. The new reservoir, when completed, will form a lake with an area of 270 acres, and will contain a storage capacity of 2,345,000,000 gallons. The neck of the valley is being bottled with a huge embankment of earth, pitched with stone, and containing an inner core of concrete. The works will send down an average daily supply of ten million gallons of water to Newcastle, and a further three million gallons will pass over the weir as compensation water.

On arrival at Catcleugh, the members were received by Mr. Henzell, the resident engineer, who explained the principal features of the work in progress. He said the work had been much interfered with by heavy rains and floods. The tunnel through which they were passing the water was 12 ft. 6 in. in diameter, and several times during the floods they had had the water over the top of the tunnel. For the last three months they had not run down less than ten million gallons a day. The chutes would pass eighteen million gallons, and when the quantity of water exceeded that they had to come out. The average rainfall of the district was 44 in.

The members were then entertained to luncheon, Mr. Henzell presiding. After luncheon,

Mr. F. J. Edge, of Newcastle, proposed the health of the officials and success to the Newcastle and Gateshead Water Company. He believed the works were unique in one respect, that this was the longest earth embankment at any waterworks in England.

The toast was heartily honoured, and Mr. Henzell spoke in acknowledgment.

The second day's meeting was held in the Council Chamber of the Town Hall, Newcastle-on-Tyne. Mr. W. Weaver, C.E., Kensington, President, was in the chair, and there were present Messrs. G. Laws, Newcastle; F. J. Edge, Newcastle; C. F. Wike, Sheffield; E. J. Silcock, Leeds; T. Hewson, Leeds; J. P. Dalton, Ryton-on-Tyne (Hon. Sec.); J. Young, Ayr; and others.

At the outset the Mayor (Alderman Anderson) offered the Association a most hearty welcome to Newcastle.

The President thanked the Mayor for the cordiality of his reception.

Mr. F. J. Edge proposed the re-election of Mr. Dalton as Honorary Secretary for the Northern Counties.

Mr. G. Laws, Newcastle-on-Tyne, seconded, and the proposition was carried.

Mr. Dalton thanked the members for his re-election.

Municipal Works, Newcastle-on-Tyne

Mr. F. J. Edge, City Engineer, read a paper on Newcastle-on-Tyne, and some of its municipal works. He said a new high-level bridge is now in course of construction by the North-Eastern Railway Company higher up the river, so that the trains from London to Scotland can continue their journey without having to be reversed at Newcastle Central Station. The tramway system consists of twenty-three route miles, all being double line except one mile, the number of miles of track being forty-five. The system commenced to be worked electrically in November, 1901. The cars are of the single-deck and double-deck type, and are all worked from one central power station, there being three car sheds, one in the centre of the city, one in the urban district of Walker on the east, one in the urban district of Gosforth on the north, and another one in course of erection in the western district of the city. The tramways extend outside the city boundary into Gosforth, Walker, and Benwell; there is no special feature in their construction, the rail being 100 lb. to the yard, and practically of the section adopted by the Standardisation Committee. During the past two years anchors have been used, principally those known as the "Winby" anchor, and the fish-plates those known as the "continuous rail joint"; it is proposed to lay about eleven miles of this track a year, and to use "Cooper" anchors and electrically-welded joints. Considerable street widening has been necessary in order to construct the tramway with double track, and during the past two years roads had to be lowered in a few places, so as to allow double-deck cars to pass under railway bridges; a new bridge had to be constructed to carry the tramway under the North-Eastern Railway at Walker, so as to avoid a very sharp turn at the foot of a steep hill; a road at Walker was raised about 7 ft., and the bridge carrying the waggon-way of the Elswick Colliery over the Scotswood-road was raised 18 in. to get sufficient head-room for double-deck cars. This last-mentioned work was the only one having any special features, as it was necessary to gain the extra head-room without altering the level of the colliery rails, owing to the waggon-way being worked by gravity. This was possible by placing cross-girders under the bottom flanges of the main girders in such a position that they would be between the tramway tracks, and therefore clear of the cars. As the colliery waggons could not be stopped until Friday night, and had to commence running again on Monday morning, it was necessary to build a completely new bridge, and work continuously to remove the old one and put the new one in place during the time allowed. The construction of the tramways was taken advantage of to repave some of the principal streets, and 91,000 square yards in the city are now paved with wood, and 28,000 square yards will be done during this year. The water supply, gas supply, and supply of electricity for private consumers is in the hands of companies, the corporation owning only the electric power station for the tramways and for the public lighting by electricity. The area of Newcastle, exclusive of the river, is 5,355 acres; the population is about 225,000. It is almost built up, and application has been made for an extension of the boundaries. If Walker and Benwell are added, the population will be increased to about 260,000. Walker, though a separate urban district of 1,149 acres, is the freehold of the city of Newcastle, there being other properties also belonging to the city, which is one of considerable wealth. What is probably the last remaining toll on goods entering or leaving a city in the United Kingdom exists in Newcastle, under the name of the "Through Toll."

Newcastle Corporation Tramways.

Mr. A. E. Le Rossignol, M.Inst.C.E., M.I.E.E., General Manager and Engineer, Newcastle Corporation Tramways, presented a descriptive account of the Newcastle Corporation Tramways. He said the history of the tramways in Newcastle commenced in 1878. After the Corporation had constructed about eight route miles of track, they leased the working of it to a company for twenty-one years, horses being the motive power. On the expiry of the lease the Corporation set about the reconstruction of the whole of the lines, which were then in a very bad state, and the introduction of electric traction; and, in the planning out of the system, a site which was owned by the Corporation approximately near the centre was chosen for the position of the power station, so as to enable direct current at 500 volts to be the system of supply. The site had several disadvantages to counterbalance the advantage of being near the centre, inasmuch as it was some distance, over a quarter of a mile, from the river, and 90 ft. above the water-level; and, further, it was all filled-in ground, being on the site of an old dene, or deep valley, which had been filled up level some time before. This situation rendered a special system of foundations necessary. The whole of the site for each building was excavated to a distance of 8 ft. below the basement level, all hard ground at either end being taken out, and a block of concrete formed the full distance and width of each building, 8 ft. thick, interlaced with steel girders, rails, all bolted and fish-plated together; and thus each building practically

floats on the soft ground below it. The foundations of the chimney, however, situated at one side of the old valley as it was, were differently arranged, piles being driven down into the hard ground below, and a heavy block of concrete, 30 ft. square, formed on top of the piles. On this an octagonal brick chimney, 180 ft. high from the level of the concrete, was built up, with a clear internal diameter of 9 ft. The whole of the power-station buildings are steel framed, filled in afterwards with brick walls, with steel roof-principals, carrying wood roofs. Coal comes direct from the railway into the top of the boiler-house, being tipped direct into the bunkers; from there falling by gravity through automatic weighing machines into the hoppers of automatic stokers. There were twelve large-size Lancashire boilers installed, which supply steam to four slow-speed engines for traction purposes, and one high-speed engine for electric lighting. All the four big engines were of the vertical marine types, with Corliss valves, two being compound of 1,000 horse-power each, one triple-expansion of 2,000 horse-power, and one triple-expansion of 3,000 horse-power, made to the author's specification, was now being installed. These engines were all direct-coupled to the dynamos, and generate current at 550 volts, which was distributed to the various feeders through a large switchboard. In the basement below the cables pass along a subway to the ends of the various lines of conduits. In one respect the station was peculiar in that the whole of the circulating water for the surface condensers of the engines had to be pumped up a quarter of a mile and 90 ft. high from the river. As this would involve a big loss in the ordinary way, the water, after passing through the surface condensers, was carried back in another pipe to the pumping station, where the centrifugal pumps were situated driven by electric motors, and passed through turbines on the same shaft as the motors, thus helping to drive the pumps and returning about 50 per cent. of the power to the motor. By this means the cost of power for pumping purposes was reduced by about half from what it would otherwise be. A special high-lift centrifugal pump was used, the largest set being capable of delivering 3,000 gallons per minute to a height of 100 ft. The construction of the track in Newcastle was at the time it was commenced, fairly typical of all track construction being carried out at the time. The gauge is the standard 4 ft. 8½ in., and the rails were laid on a concrete foundation 7 in. thick, extending over the whole track. The rails weigh 101 lb. to the yard, and the double tracks were laid 3 ft. 6 in. apart in the narrow streets, and 5 ft. 8 in. apart where centre poles were intended to be used. Between the centres of the track the conduits, consisting of special fire-clay ducts, were laid solid in concrete; and, as the Corporation wished to avoid continually pulling up the streets as extensions were required, a larger number of ducts than were actually necessary at the time were laid in nearly all the streets. From the power station three main lines of ducts were laid, one of thirty ducts to the west, one of thirty ducts to the north, and one of twelve ducts to the east, and the manholes varied in size from 8 ft. square for the large numbers of ducts to 4 ft. square for any number of ducts up to nine. All sharp curves on the track were laid with increasing curvature, commencing with a long radius, and finishing with the required radius at the centre of the curve, and all had been laid to standard gauge; whilst the whole of the special work, points and crossings, had renewable hard steel centres, which were fixed in with white metal, and could be taken out when worn and new ones put down. Two systems of paving were in operation, namely, granite blocks and hard-wood paving, the latter having been adopted for the whole of the central portion of the city. Experience had shown, since the track was constructed, that the heavy bogie cars, which were run on some of the routes, cause a great deal of loosening of the paving, which originated from the hog-backing of the rails, due to the rolling out of the top fibres of the metal, and this hog-backing of the rail leaves a cavity underneath the base into which water finds its way, and acts as a hydraulic pump, each time a car passes over, to raise the adjacent paving. This showed up very much on the roads on which the heavy bogie cars run, and could only be cured by the insertion of anchors into the concrete below the rail, which hold the rail firmly down to the concrete, and prevent this action, and all the new work was being carried out with the anchors. The first rails used were 45 ft. in length, but the length had now been increased to 60 ft., and all joints were laid butted up together, a clip fish-plate being used, which holds the bottom flanges in line and prevents jumping at the joints. The overhead work was of heavy construction, 0.4 in. diameter trolley wire being used, suspended over the centre of the track by centre-pole brackets where the streets were wide enough, or by span wires and side poles where the streets were narrow; and automatic lever frogs control the trolley at junctions. Combined with the overhead work was the electric lighting, by arc lamps, of the whole centre portion of the town, 222 lamps being fixed at the top of the poles in the main streets. These lamps were supplied with current by separate cables from the power station, were forty yards apart, and were on alternate cables, so that should one series fail the street would still be supplied with half the usual amount of light, and in summer an economy could be effected by half of the lamps never being lit, whilst half were always turned out every night after twelve o'clock. The overhead work itself was divided up into the usual half-mile sections, which were fed by separate feeders in such a way that the breakdown of any outlying section did not affect the centre portion of the city. There were several types of cars in use; single-deck cars having to be adopted at first because of the existence of several bridges which prevented double-deck cars being used. The height under these bridges had now been increased, to admit double-deck cars, by lowering the road; but the single-deck bogie cars, of which sixty were originally ordered, were in very great favour with the travelling public, who find them convenient to get into and easy riding. These all had an open portion at each end, in which smoking was permitted, the only drawback being, from the smokers' point of view, that ladies frequently occupy these seats in the summertime to the exclusion of the smokers. These bogie cars were 40 ft. in length, with 15 ft. bogie centres, each bogie having equal-sized wheels of 31 in. diameter. And there were, in addition, twenty-two bogie cars of the same length, which had been built by the department with double-decks, and carried 102 passengers, these cars being principally used for meeting a heavy rush of traffic at any time. The single-deck bogie cars had two motors of 30 horse-power each, and the double-deck bogie cars four motors of smaller size. The remainder of the rolling-stock consisted of four-wheel cars, a few of these being single deck, and over eighty being double deck, of the standard type, driven by two motors.

The members then proceeded to inspect the power station at Manors, the car sheds and workshops at Byker, the Armstrong Park and Jesmond Dene, and in the afternoon the works in connexion with the construction of the new high-level bridge over the Tyne for the North-Eastern Railway.

THE LONDON COUNTY COUNCIL.

THE ordinary weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring Gardens, Mr. J. Williams Benn, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee it was agreed to lend Battersea Borough Council 11,042*l.* for electric lighting purposes; Camberwell Borough Council 400*l.* for housing purposes; Lambeth Borough Council 18,435*l.* for paving works; St. Pancras Borough Council 19,000*l.* for electric light installation, and Wandsworth Borough Council 5,785*l.* for street improvements.

Springfield Estate, Upper Clapton.—On the adjourned further report of the Parks and Open Spaces Committee it was agreed after discussion that the supplemental estimate of 16,750*l.* submitted by the Finance Committee be approved, and that further temporary expenditure of that amount be authorised in connexion with the purchase of the Springfield estate, such expenditure being ultimately recovered.

Memorial, Brockwell Park.—The Parks and Open Spaces Committee recommended that the design of the drinking fountain proposed to be erected in Brockwell Park as a memorial to the late Mr. Candler (who was an Alderman of Lambeth Borough Council) on a site near the Water-lane entrance to the park, be approved. The recommendation was agreed to.

Factory and Workshop Acts.—The Building Act Committee submitted the following report:—

"The attention of the Council having been called by H.M. Inspector of Factories to the inadequate means of escape in case of fire from the factory premises situated at 31a, Old-street and 90, Goswell-road, a sealed notice under section 7 of the Factory and Workshop Act, 1891, was served upon the owner in 1900 requiring him to carry out certain requirements to provide means of escape for the persons employed on the premises. The requirements of the notice were not complied with, and a summons was therefore taken out for the purpose of enforcing compliance therewith. The summons was dismissed on the ground that the notice required the owner to construct a staircase in such a position as to necessitate a trespass being committed on a part of the premises occupied by another firm, and an appeal against this decision was dismissed by the High Court. By the Act of 1901, section 149, it is provided that the whole of a 'tenement' factory or workshop shall be deemed to be one factory or workshop, and it was therefore decided to serve a fresh notice upon the owner of the premises, the two factories, occupied by Mr. Pillivant and the Paper Cutting Company respectively, being treated as a tenement factory. The matter was referred to arbitration, and at the hearing the owner applied to the umpire to state a case for the opinion of the High Court as to whether or not these premises constituted a tenement factory within the meaning of the Act. The case came on for hearing before a Divisional Court on April 27, 1904, and the court decided that the premises were not a tenement factory within the meaning of section 149 of the Act of 1901. The Lord Chief Justice, in giving judgment, stated that the case gave him very great difficulty, because whatever construction was placed upon the section (whether that contended for by the owner or that contended for by the Council) it created difficulties; but looking at section 149 as a whole he felt the language contained in the definition of a 'tenement' factory was not sufficiently plain to enable the Court to say that these premises came within the definition, and he was of opinion that so far as a tenement factory was concerned the Act was intended to be limited to a building or buildings containing two or more factories in different occupations, the mechanical power for which was supplied from one source, and did not apply to buildings containing two or more factories in different occupation the mechanical power for which was obtained from different sources, as in the present case. The effect of the judgment is to make it impossible for the Council to deal with the premises under the Factory and Workshop Act, and we have so informed the Secretary of State for the Home Department. We report the facts for the information of the Council."

Improvements.—The following recommendations of the Improvements Committee were agreed to:—

"That the estimate of 2,300*l.* submitted by the Finance Committee be approved; and that the Improvements Committee be authorised to secure the widening of Bostall Hill to 50 ft. at its junction with Basildon-road in general accordance with the plan presented to the Committee on March 23, 1904, provided that one-third of the net cost of the improvement shall be borne by the Council of the Metropolitan Borough of Woolwich, and that one-third shall be charged to the tramways account, the remaining one-third being charged to the account of the improvement.

"That the estimate of 1,800*l.* submitted by the Finance Committee be approved; that consent be given to the widening of Blythe-road between Sterndale-road and Dewhurst-road and the continuation of Augustine-road into Blythe-road as carried out by the Council of the Metropolitan Borough of Hammersmith in substantial accordance with the plan presented to the Improvements Committee on July 26, 1899, and that a contribution be made of one-third of the net cost of the improvement, provided that such contribution shall be limited to 1,800*l.*

"That the offer of the Council of the Metropolitan Borough of Woolwich to undertake, at an estimated cost of 2,224*l.* 8s. 9d., certain paving and other works connected with the widening of Mill-lane, Woolwich, be accepted."

The Council adjourned at 7.30 p.m.

THE SURVEYORS' INSTITUTION.—At the annual general meeting of the junior members of the Surveyors' Institution, held on the 9th inst., the honorary secretary, Mr. W. S. Walker, retired, and Mr. Sydney A. Smith, of 22, Chancery-lane, was appointed in his place. At the meeting which followed a paper was read by Mr. Smith on the subject of "The Junior Surveyor." Owing to the large attendance the meeting had to transfer to the Great Hall. A long discussion followed the paper.

HYDROPATHIC BUILDING, CLIFTONVILLE, MARGATE.—On the 4th inst. the opening took place of this new hydropathic establishment, which, in addition to the baths, etc., is arranged as an up-to-date hotel. A feature of the building is a roof garden, which is reached by a lift. The roof was executed by Vulcanite, Ltd., of Cannon-street, E.C., and Laganvale, Belfast. The architect of the building was Mr. S. E. Burrows, of Margate, and the builders were Messrs. Anderson Brothers, also of Margate.

WAR MEMORIAL, DUBLIN.—A memorial to the men of the Dublin Company of the Imperial Yeomanry who were killed in the South African war was recently unveiled in the grounds attached to St. Andrew's Church, Dublin. The memorial consists of a Portland stone pedestal with a polished granite shaft, supporting a Corinthian carved capital, surmounted by an imperial crown. There are four panels on the pedestal. The monument has been erected from the designs of Mr. A. E. Murray, architect, the contract being carried out by Mr. L. F. Harrison, of Dublin.

APPLICATIONS UNDER THE 1894 BUILDING ACT.

THE London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

Lines of Frontage and Projections.

Lewisham.—Buildings on a site abutting upon the north-east side of Kirkdale, south-east side of Peak-hill-road, and south-west side of Peak-hill, Sydenham (Messrs. Tompkins and Connew).—Consent.

Kensington, South.†—Residential flats on a site abutting upon the north side of Holland-street and east side of Campden-hill-road, Kensington (Mr. W. G. Hunt for the Kensington Estates Company, Ltd.).—Consent.

Deptford.—A porch in front of "Tressillian Lodge," Tressillian-road, Brockley (Messrs. Adams and Son for Mr. H. Richardson).—Consent.

Hackney, Central.—A one-story shop upon part of the forecourt of No. 261, Mare-street, Hackney (Mr. R. W. Hobden for Messrs. Scopes and Sons).—Consent.

Hackney, North.—The erection at No. 43, East Bank, Stamford Hill, Hackney, of an oak and tile porch to the front entrance and of an oak and tile pent over the side entrance, abutting upon Dunsmure-road (Mr. W. J. Ellis for Mr. T. Saxon).—Consent.

Kensington, North.—The retention of an iron and glass porch in front of No. 79, Cambridge-gardens, Kensington (Messrs. Frend, Houchin, and Morris for Dr. W. Roberts).—Consent.

St. George's, Hanover-square.—Oriel windows at No. 33, Dover-street, Piccadilly (Mr. J. S. Gibson for The Mexborough House, Ltd.).—Consent.

Kensington, South.†—A one-story building in front of the Oratory House, Brompton-road, Brompton (Messrs. Johnson, Saul, and Co. for the Very Rev. Father Bowden).—Refused.

Dulwich.†—A one-story building at the rear of No. 21, East Dulwich-road, Dulwich, to abut upon Solway-road (Mr. A. E. Mullins for Mr. E. Mathews).—Refused.

Fulham.—Two one-story shops over the District Railway on the west side of North End-road, Fulham (Mr. G. Estall for the Metropolitan District Railway).—Refused.

Lewisham.—One-story shops upon part of the forecourt of No. 62, London-road, Forest-hill, Lewisham (Mr. A. W. Coombs).—Refused.

Width of Way.

Peckham.†—A building on the site of No. 7, Elizabeth-terrace, McDermott-road, Peckham, with a forecourt boundary at less than the prescribed distance from the centre of the roadway of the street (Mr. W. D. Crowhurst).—Consent.

Clapham.—Permission to retain Nos. 27, 29, and 29A, Upper Orchard-street, Lyham-road, Clapham, with the forecourt fences at less than the prescribed distance from the centre of the roadway of the street (Mr. G. Herridge, junr.).—Consent.

Bermondsey.—Rebuilding of "The Brunswick" public-house, No. 148, Old Kent-road, Bermondsey, with external walls as less than the prescribed distance from the centre of the roadway of Alfreton-street (Mr. W. M. Brutton for Messrs. Truman, Hanbury and Buxton, Ltd.).—Consent.

Islington.—A one-story building in the yard of No. 10, Pleasant-passage, Holloway-road, Islington, with the boundary of such yard at less than the prescribed distance from the centre of the roadway of Slaney-place (Mr. A. E. Symes for Mr. P. C. Farmer).—Consent.

Kennington.—A one-story building at the rear of No. 4, Cobbett-street, Clapham, with external walls at less than the prescribed distance from the centre of a roadway next those premises (Messrs. Flood and King for Mr. F. C. N. Flood).—Consent.

Limehouse.—Buildings on the site known as "Old Wheatsheaf Wharf," on the east side of High-street, Wapping, and of other buildings on the west side of that street between Wapping-dock-street and No. 107 (Mr. J. Brewer for the governors of the Bridewell Royal Hospital).—Consent.

Southwark, West.—A building on the east side of Harrow-street, Southwark, with external walls at less than the prescribed distance from the centre of the roadway of the street (Mr. G. Lethbridge for Messrs. T. Peet and Son).—Consent.

Whitechapel.—That the application of Messrs. Plumbe and Harvey for an extension of the period within which the erection of buildings on the northern and southern sides of Romford-street, Commercial-road, East, Mile-end Old-town, was required to be commenced be granted.—Consent.

St. George's-in-the-East.—A warehouse on the south side of Wellclose-square, St. George's-in-the-East (Messrs. Nash and Detmar for the Tower Tea Company).—Refused.

Width of Way and Lines of Frontage.

Walworth.—A building on the site of No. 2, Merrow-street, Walworth, with a projecting one-story shop in front (Messrs. Goodwyn and Sons for Mr. A. Walker).—Consent.

Width of Way and External Woodwork.

Lambeth, North.—The erection of Nos. 77, 79, 81, 83, 85 and 87, Lambeth-walk, Lambeth, with oak mouldings to the windows and such buildings to abut also upon Fitzalan-street (Mr. R. C. Gleed for Messrs. P. and G. Geen).—Consent.

Lines of Frontage and Construction.

Marylebone, West.—An addition to the Capland-street school, St. Marylebone, and a play shed in the playground of such school, to abut upon Grove-road and North-street (Mr. T. J. Bailey for the School Board for London).—Consent.

Strand.—An external staircase at the Lyric Theatre, Shaftesbury-avenue, St. James', Westminster, to abut upon Great Windmill-street (Mr. A. B. Jackson).—Refused.

Islington, North.—Wood and iron additions to a temporary wood and iron building on the west side of Hornsey-road, Islington (Mr. A. Goodchild for the representatives of the Hornsey-road Baptist Church).—Refused.

Deviations from Certified Plans.

Strand.—Deviations from the plans certified by the district surveyor so far as relates to the proposed rebuilding of Nos. 85 and 86, Jermyn-street, and Nos. 10 and 11, Ormond-yard, St. James's (Mr. G. D. Martin for the Waterloo Syndicate).—Consent.

Space at Rear.

Holborn.—A modification of the provisions of section 41 with regard to open spaces about buildings, so far as relates to the proposed erection of a stable building on the west side of Kean-street, Drury-lane, Holborn, with an irregular open space at the rear (Messrs. D. Cubitt, Nichols, Sons, and Chuter for Messrs. W. H. Smith and Son).—Consent.

Mile-end.—A deviation from the plans approved in respect of the erection of the "Black Boy" inn, and a shop adjoining, with stabling at the rear, on a site on the north side of Mile-end-road, westward of Globe-road, so far as relates to an alteration in the elevations and sections of such buildings (Mr. W. Husband for Mrs. E. A. Coake).—Consent.

Walworth.—A modification of the provisions of section 41 with regard to open spaces about buildings, so far as relates to the proposed erection of No. 389, Walworth-road, Walworth, with an open space at the rear (Messrs. Goodwyn and Sons for Mr. A. Walker).—Consent.

Kennington.—An addition at the rear of No. 71, Hartington-road, South Lambeth (Mr. T. R. Richards for Mr. G. A. Riddell).—Refused.

Paddington, South.—An addition at the rear of No. 16, Bayswater-terrace, Bayswater-road, Paddington (Messrs. Frank, Brown, and Humphreys for the Misses M. E. and E. F. Johnston).—Refused.

Cubical Extent.

Hoxton.—The erection at the Gutta Percha Company's premises, Wharf-road, Hoxton, of a building with two divisions each exceeding in extent 250,000 but not 450,000 cubic feet, and to be used only for the purposes of the manufacture of submarine cables as shown (Mr. P. E. Pilditch for the Gutta Percha Company).—Consent.

Westminster.—An addition to an existing two-story building at the premises of the Stag Brewery, Palace-street, Pimlico (Mr. M. P. Saunders for Messrs. Watney, Combe, Reid, and Co.).—Consent.

Formation of Streets.

Chelsea.—That an order be issued to Mr. G. D. Martin, sanctioning the formation or laying out of a new street, for foot traffic only, to lead from Brompton-road to Basil-street, Chelsea (Mr. D. H. Evans).—Consent.

Hammersmith.—That an order be issued to Mr. J. H. Richardson, refusing to sanction the formation or laying out of a street, for foot traffic only, to lead from Uxbridge-road to Stowe-road, Shepherd's-bush (for Messrs. Griggs Brothers).—Refused.

Height of Buildings.

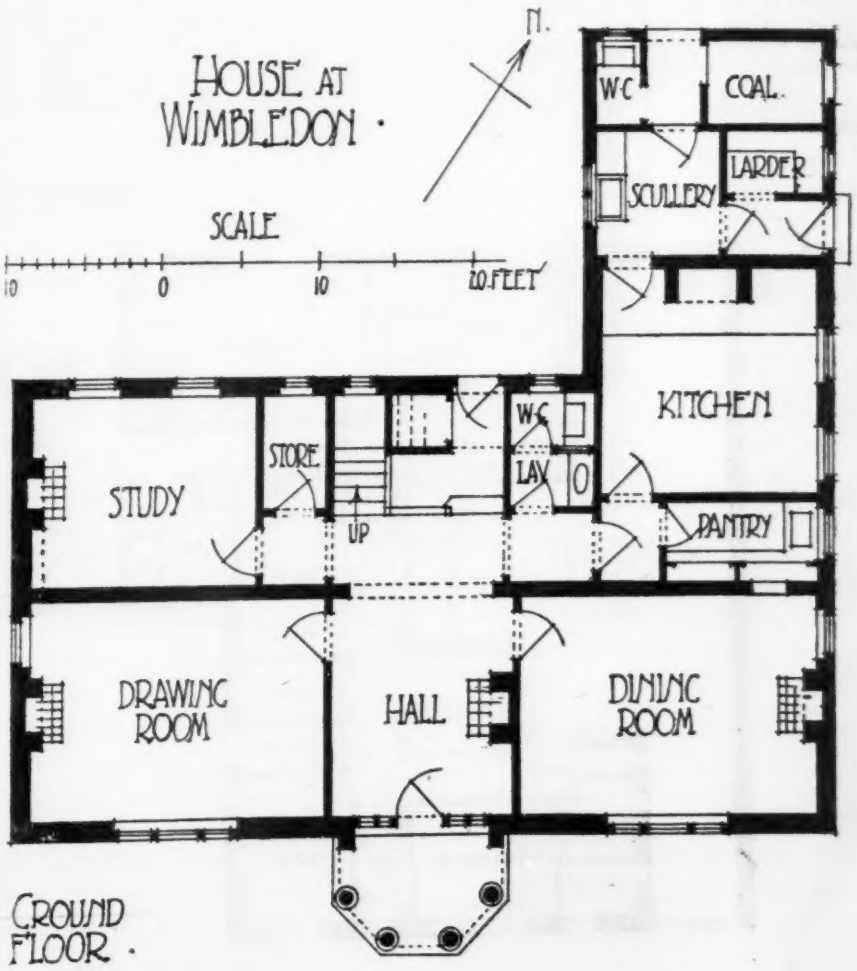
Whitechapel.—The erection of a portion of the south block of the Jews' free school, Bell-lane, Spitalfields, to abut upon Strype-street (Mr. E. R. Robson).—Consent.

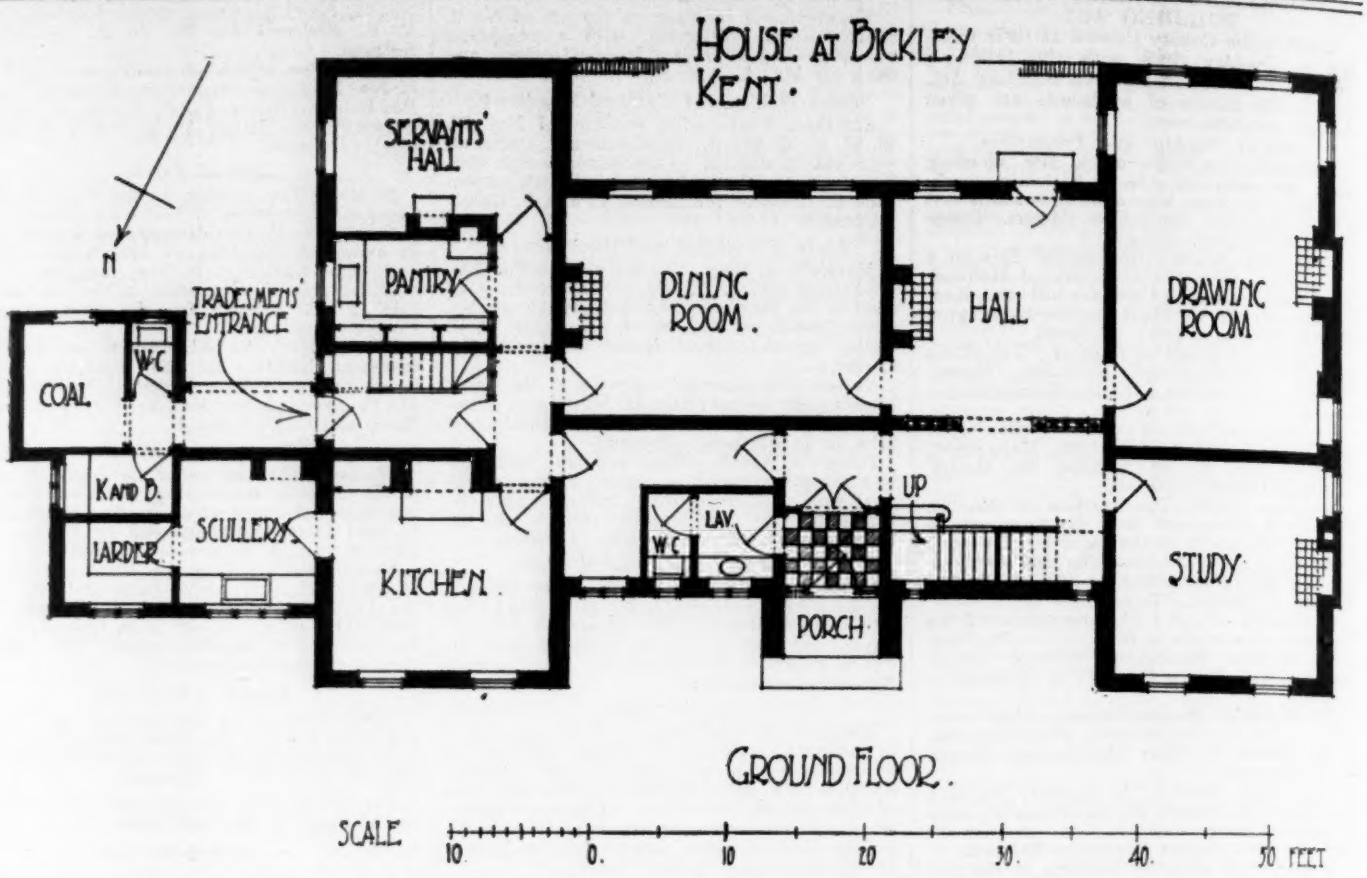
The recommendations marked † are contrary to the views of the local authority.

Illustrations.

EXTENSION OF THE SHEFFIELD PUBLIC MUSEUM AND MAPPIN ART GALLERY.

THESE bulidings are in Weston Park, about a mile from the centre of the city of Sheffield. The museum is an old residence with modern galleries at the back. The Mappin Gallery is a building erected in 1890 from the designs of Messrs. Gibbs and Flockton in the Grecian Ionic





style, and is connected to the museum by a corridor.

The design is for extensions of both buildings and a combination of them, so as to present an important façade to the park.

The existing Mappin Gallery is the central feature, and the extensions are to be wings in advance of it and connected by quadrants, together forming three sides of an entrance court with Italian garden.

The existing buildings are marked on the plans by cross lines. The principal feature of the interior of the new museum will be the Long Gallery, which will connect the other galleries and be a side approach to the Mappin Gallery and on its axial line.

GIBBS AND FLOCKTON.

HOUSE AT WIMBLEDON.

THIS house, in a somewhat altered form, is built at Wimbledon. The walls are rough cast, and the roof is covered with red Wrotham tiles.

The builders are Messrs. Garrett and Son, Balham Hill, S.W. Mr. Ernest Newton is the architect.

HOUSE AT BICKLEY.

THIS house is being built at Bickley.

The site has many old trees and an old walled garden.

The materials are red Wrotham bricks and tiles; the windows are painted white, and the sun shutters green.

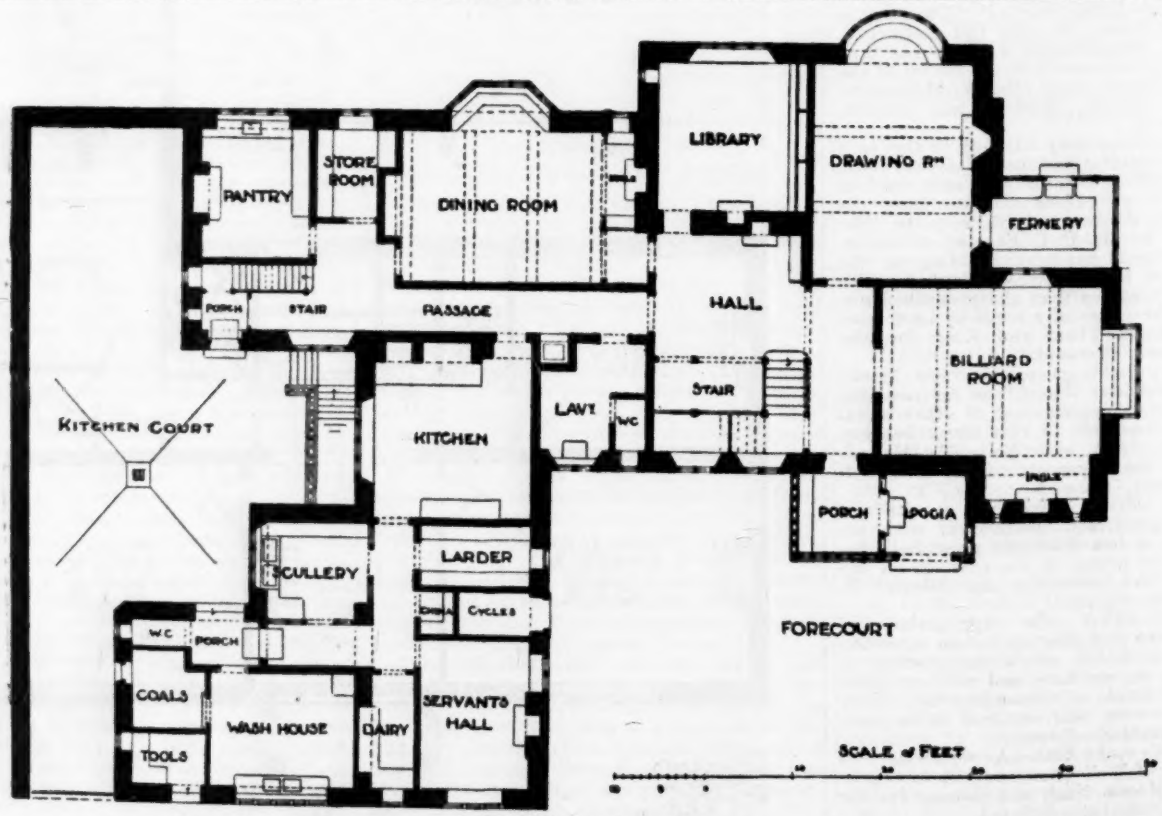
The builder is Mr. F. P. Duthoit, of Bromley, Kent. Mr. Ernest Newton is the architect.

"BIBSWORTH," WORCESTERSHIRE.

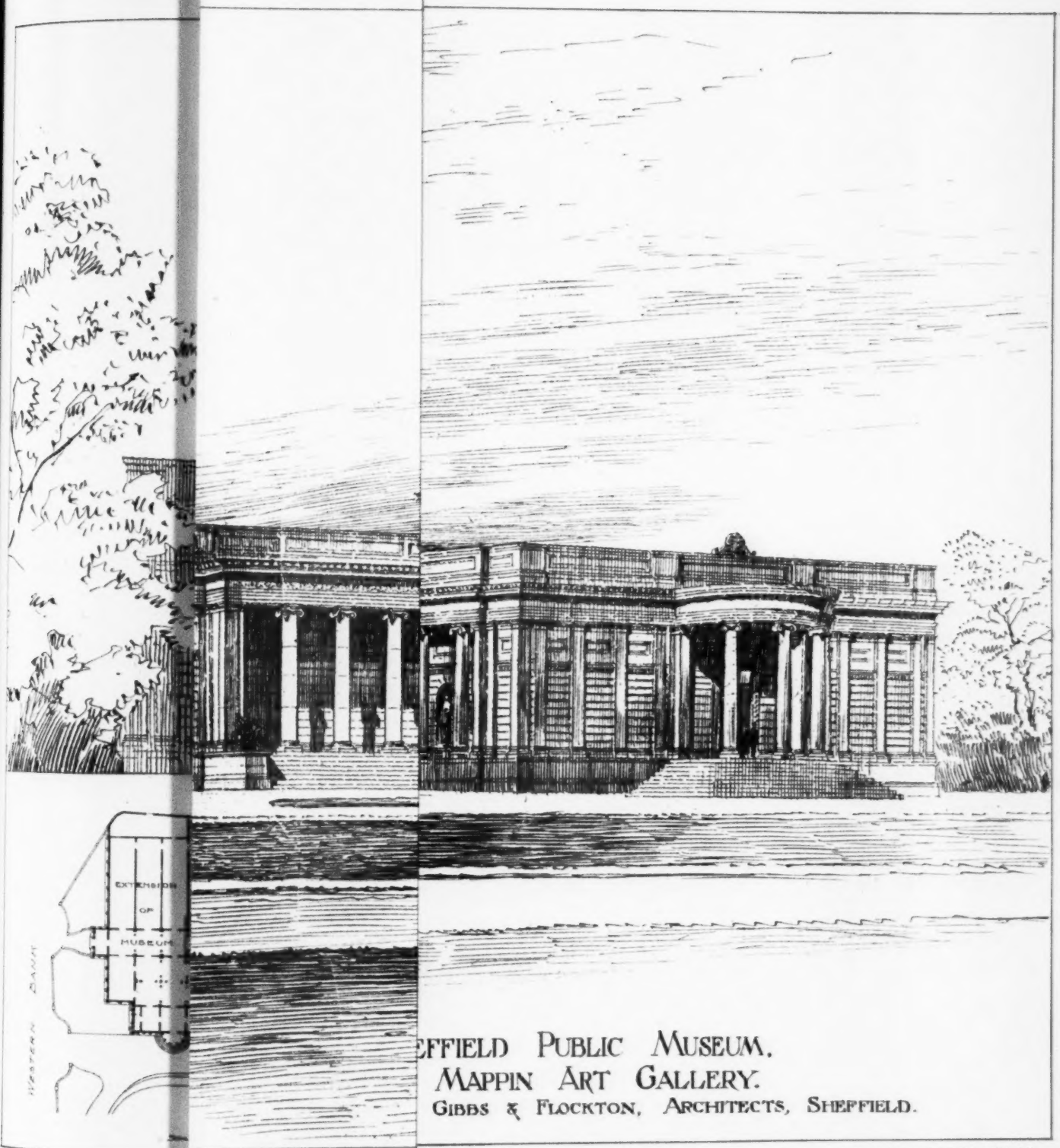
THIS house, now nearing completion, lies on a slope of the Cotswold Hills, overlooking the Evesham Vale. It is built of locally-quarried stone, with stone slated roof, oak mullioned windows, and latticed lights, and red-brick chimney stacks. The house, stables, and gardens have been designed by Mr. E. Guy Dawber, of London; the builders being Messrs. Espley, of Evesham. The whole of the lead-glazing and iron casements have been made by Mr. John Pye, of Moreton-in-Marsh.

"BRAHAN," PERTH.

THIS is a view of the garden part of a house built from the designs of Messrs. Bedford and



"Brahan," Perth. Plan.



EFFIELD PUBLIC MUSEUM.
MAPPIN ART GALLERY.
GIBBS & FLOCKTON, ARCHITECTS, SHEFFIELD.

"INK-PHOTO" SPRAGUE & Cº LTD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

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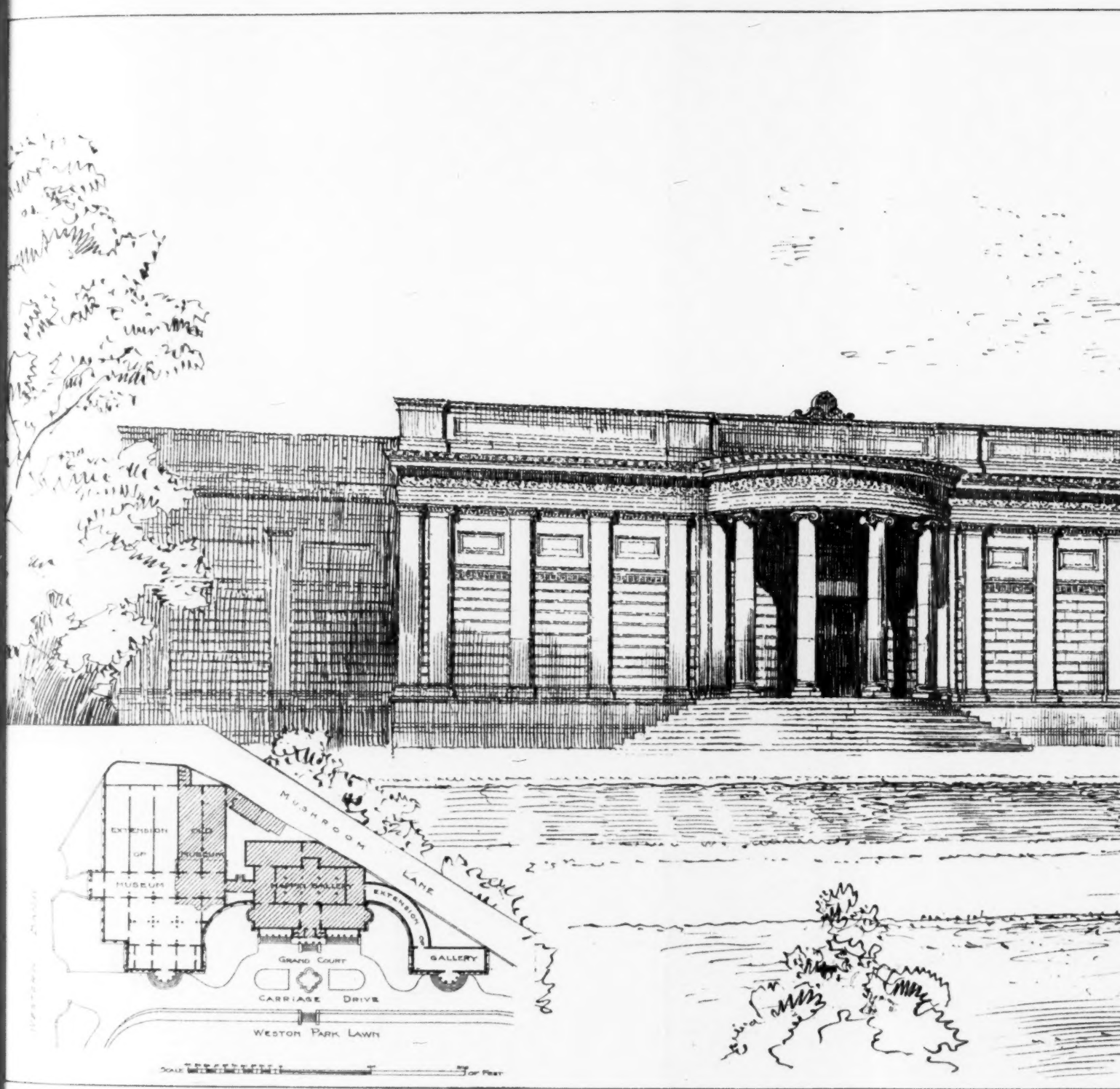

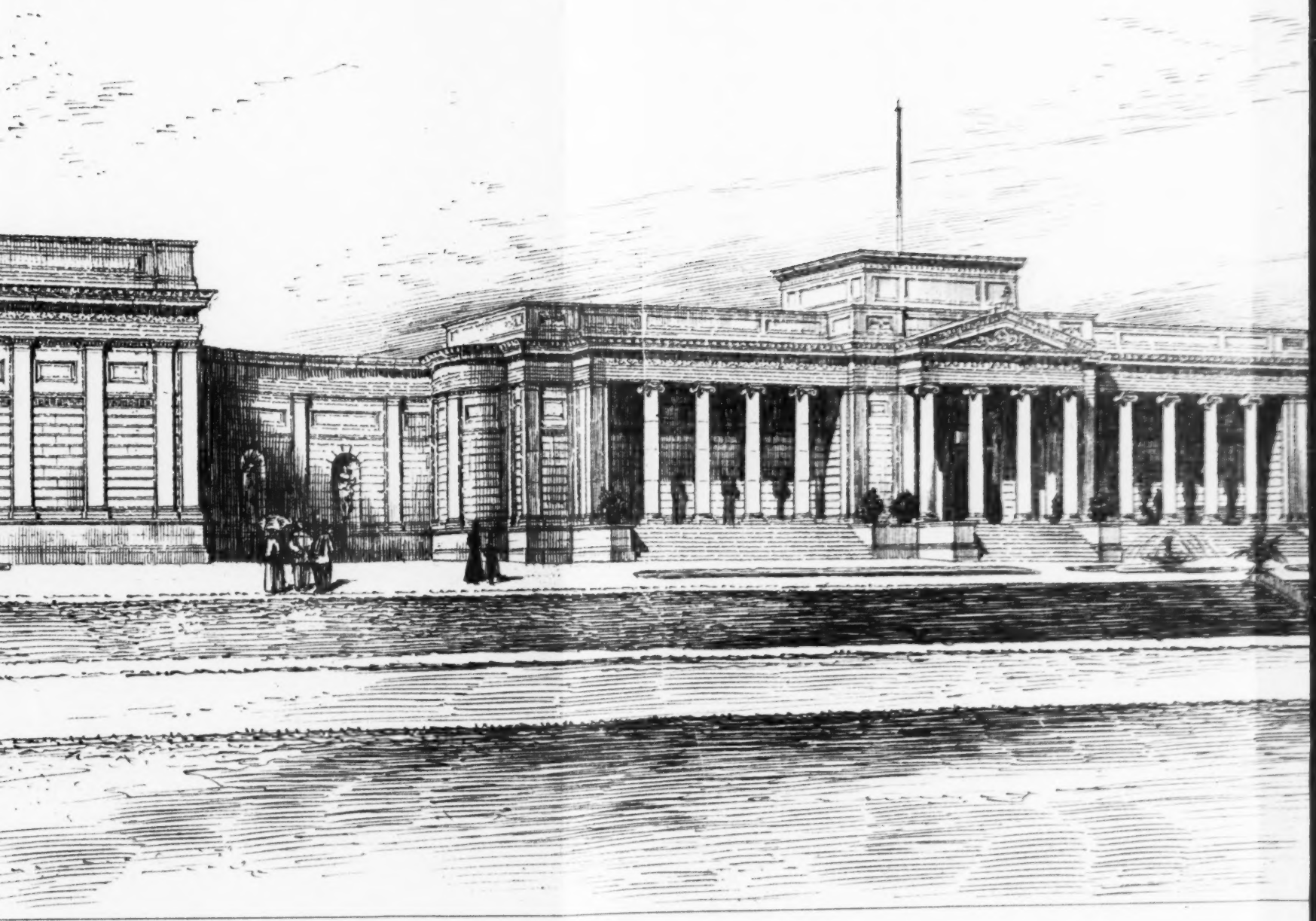

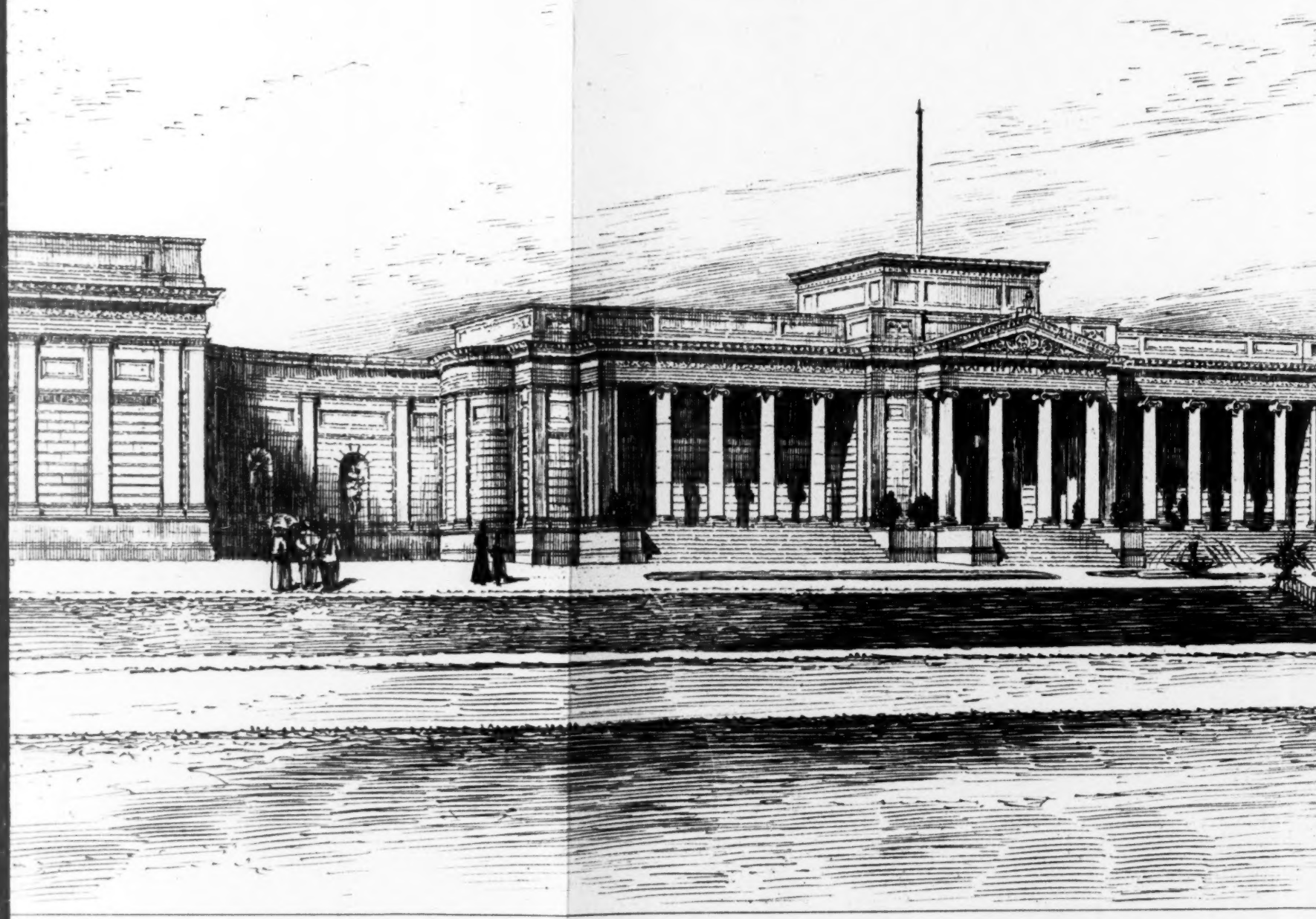

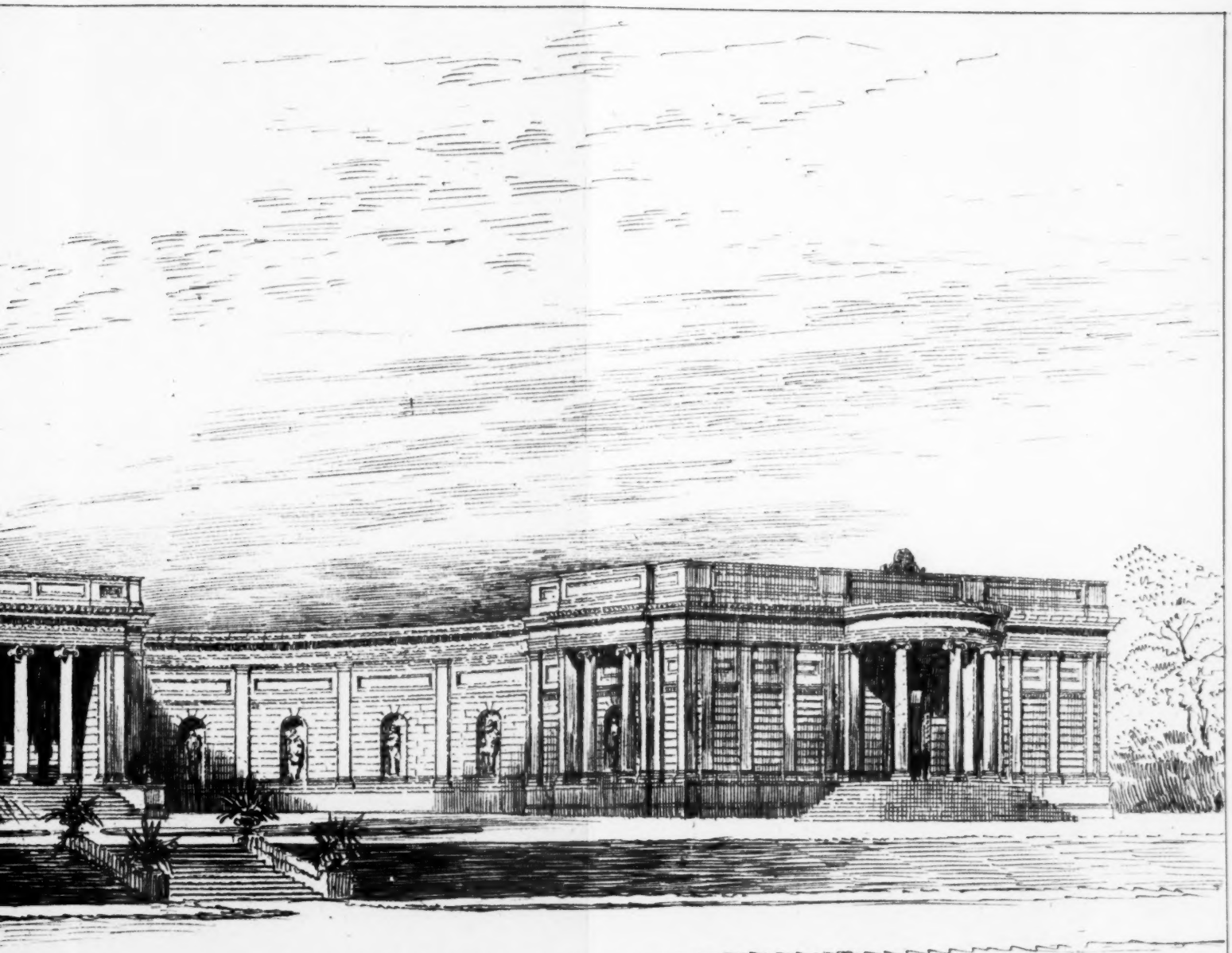

EXTENSION OF THE SHEFFIELD PUBLIC MUSEUM.
AND THE MAPPIN ART GALLERY.
GIBBS & FLOCKTON, ARCHITECTS, SHEFFIELD.

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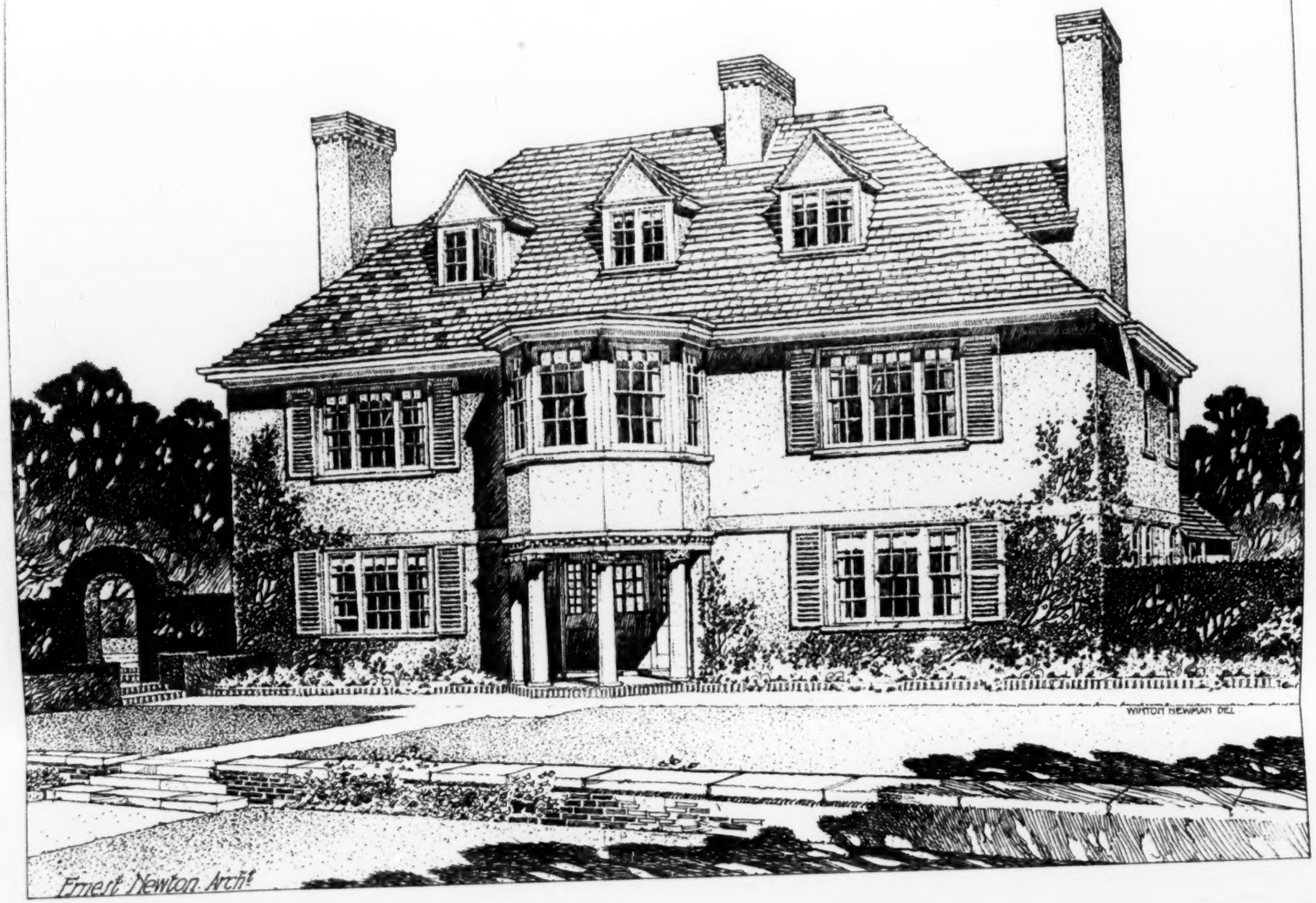

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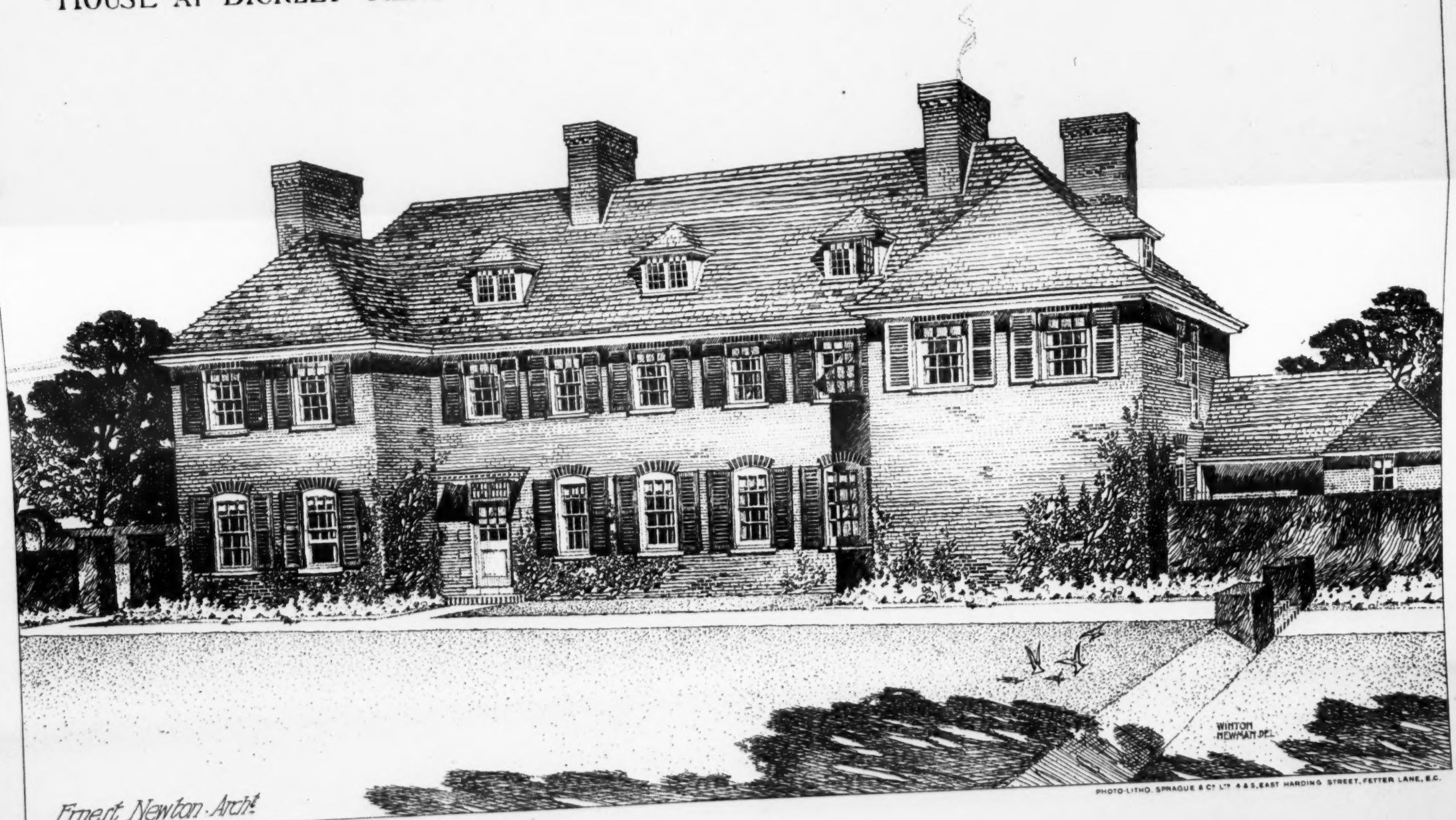

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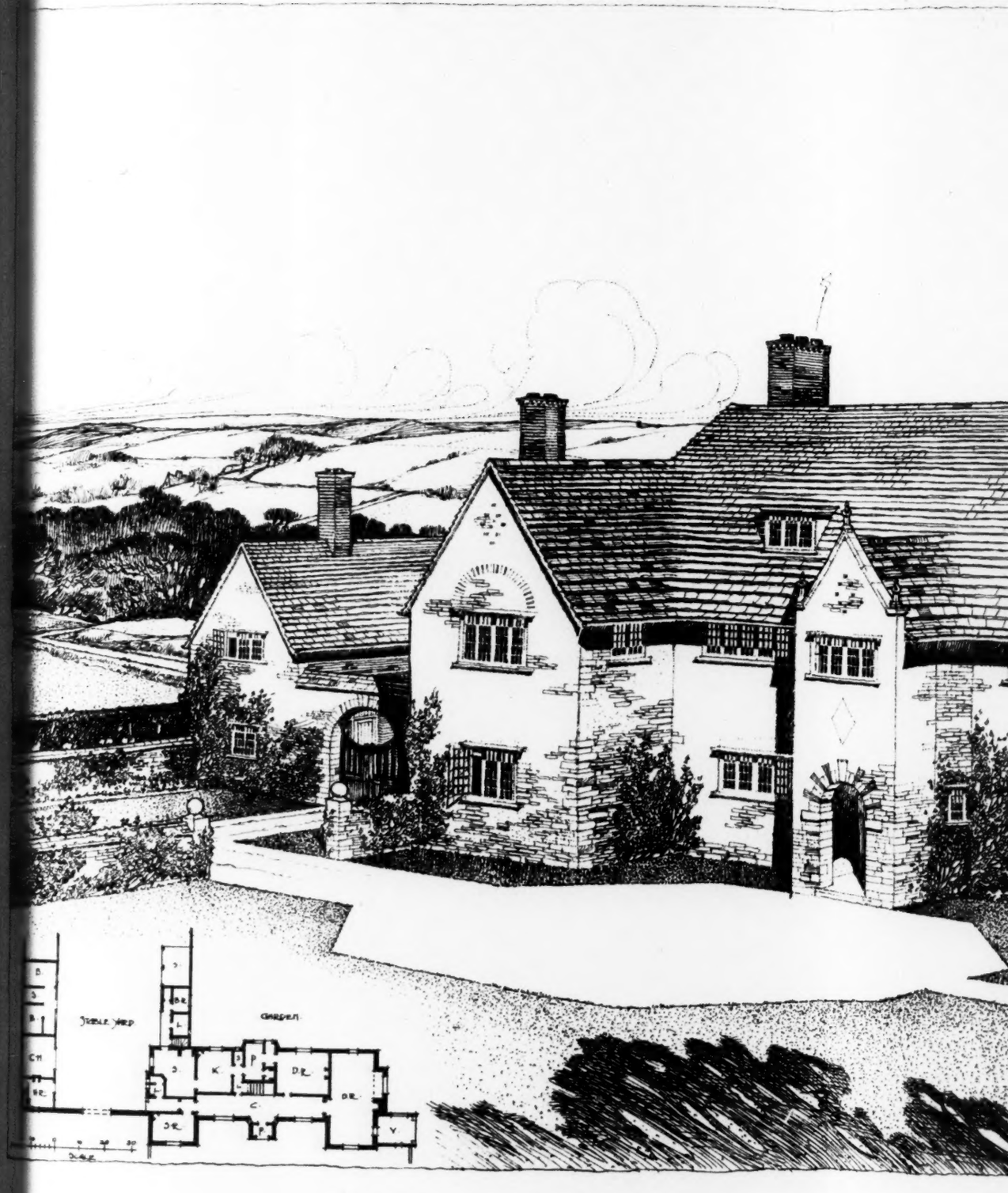
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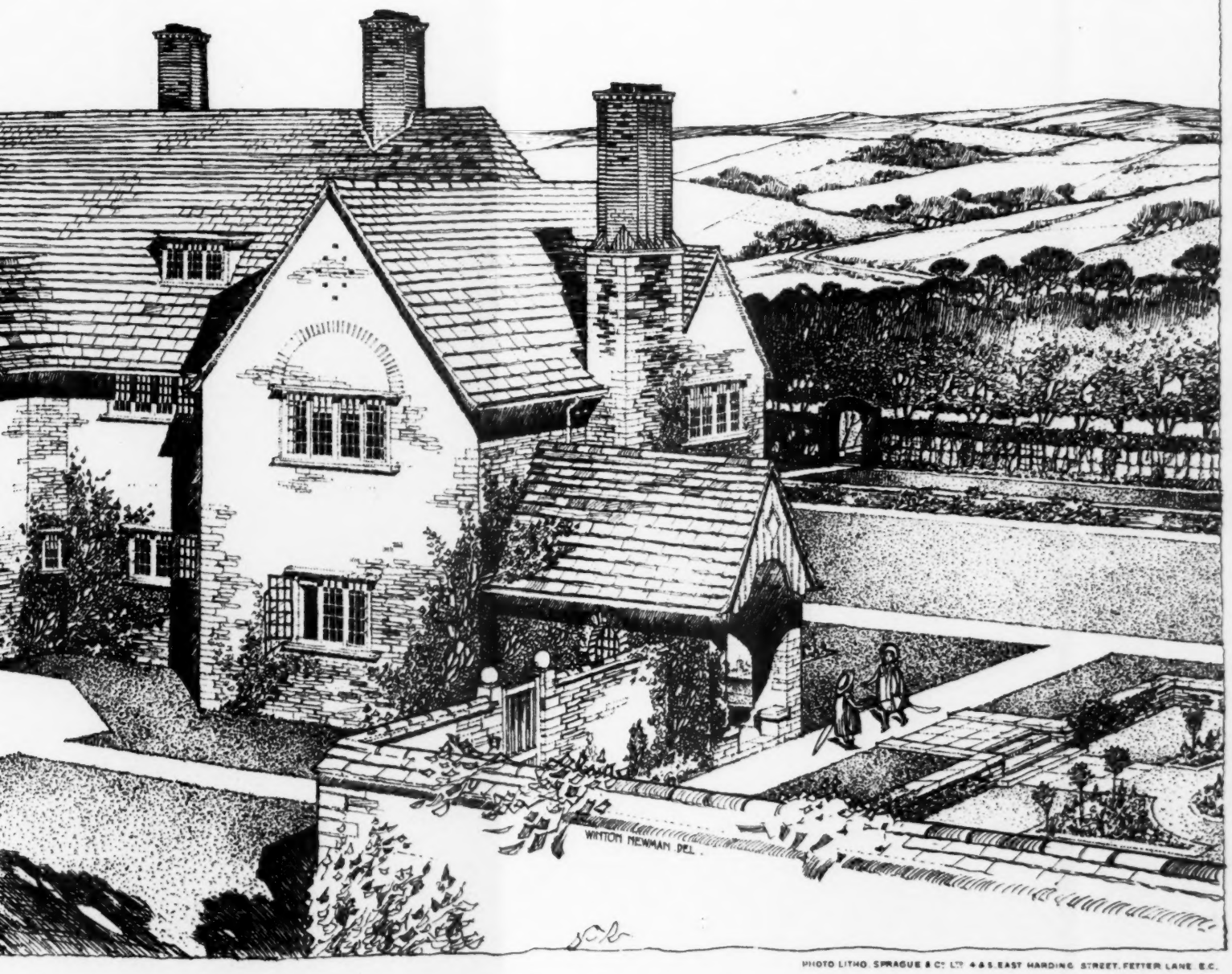

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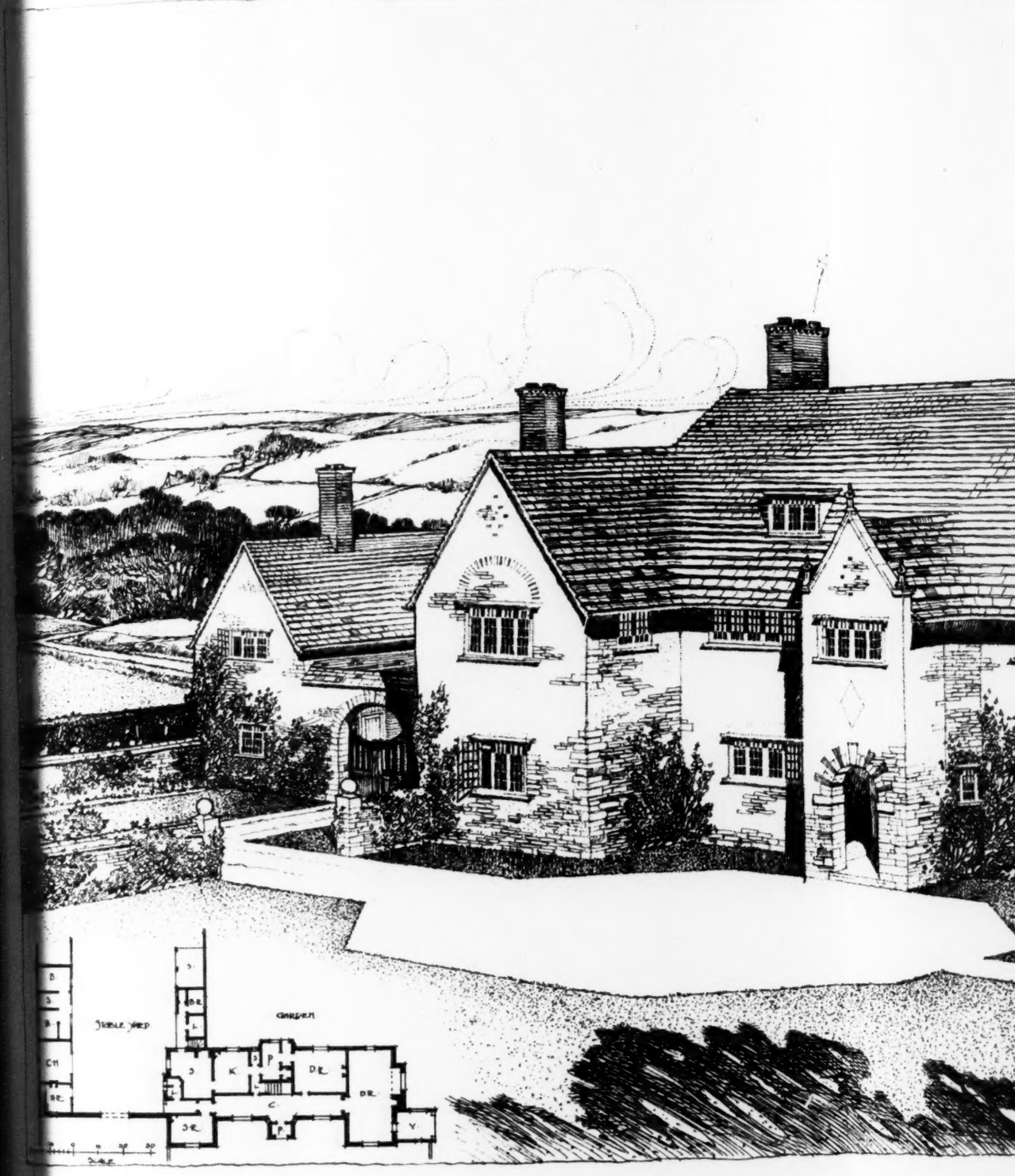
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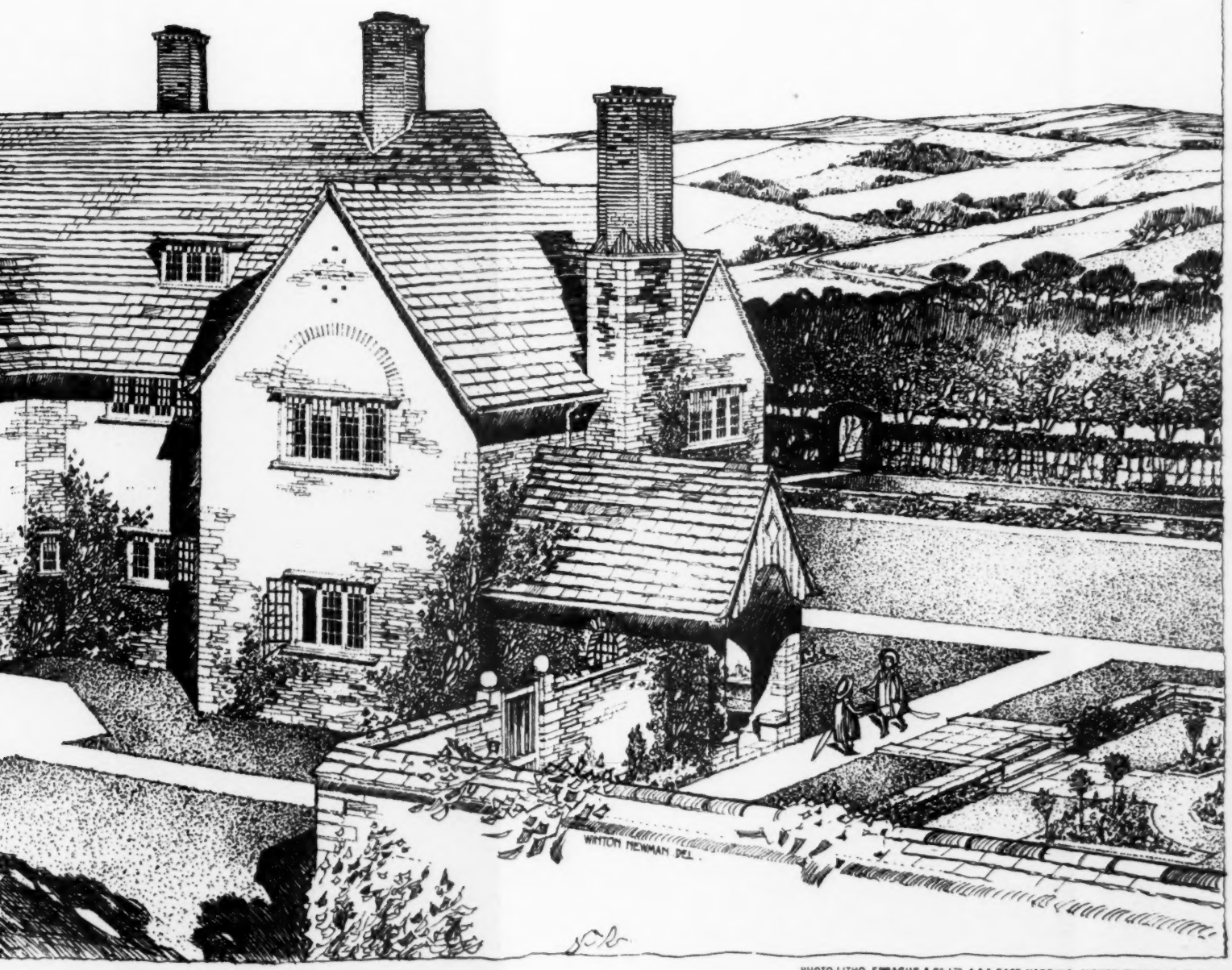

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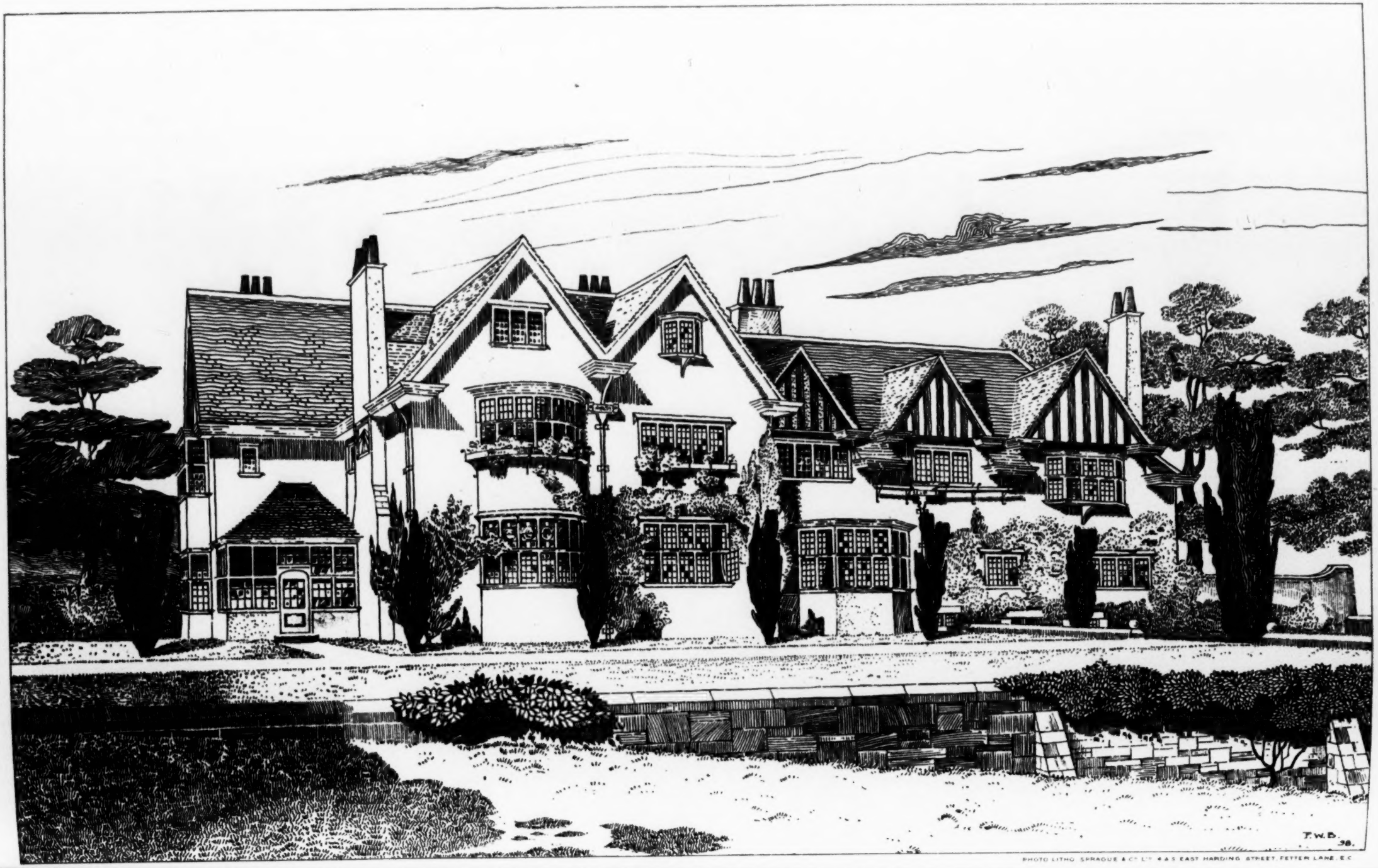

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"BRAIRAN," PERTH: GARDEN FRONT.—MESSRS. DAVIDSON & ROBSON, ARCHITECTS.

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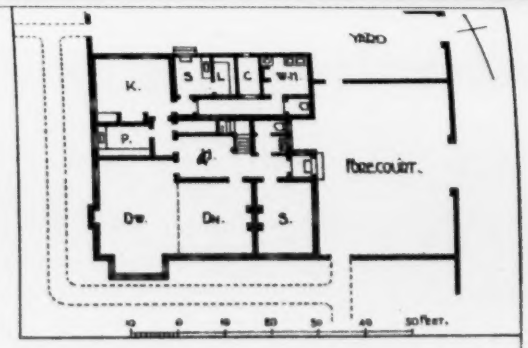
"BRAHAN," PERTH: GARDEN FRONT.—MESSRS. DEMPSTER & ROBSON, ARCHITECTS.



ALL HALLOWS VICARAGE
LEEDS + + +
BEDFORD & KITSON ARCHTS.

Kitson, of which some illustrations have already been given.

A plan of the ground floor is appended.

ALL HALLOWS VICARAGE, LEEDS.

THE new vicarage was built in 1903 on a site to the north of the church. The terrace, running along the south of the house, slopes down to the churchyard, the steps leading to the vestry door. The dining-room and drawing-room are separated by large folding doors so that the two rooms can be thrown into one large room for parish meetings, ladies' sewing-parties, etc. The external walls are built of local red bricks, a fine sandstone being used for the doorway, window sills, etc.; the roofs are covered with red tiles. The principal contractors were Messrs. Myers and Sons and Messrs. Atkinson and Sons, of Leeds. The architects were Messrs. Francis W. Bedford and Sydney D. Kitson, of London and Leeds.

ARCHITECTURAL SOCIETIES.

EDINBURGH ARCHITECTURAL ASSOCIATION.—The members of this Association journeyed to Dunfermline on Saturday last week for the purpose of viewing the Abbey and the new Carnegie Baths and Gymnasium. At the north porch of the Abbey the various changes of style in the group were explained by Mr. Hippolyte J. Blanc, who ventured the opinion that the generally-assigned date of 1070 could scarcely be supported in view of what was known to have been the practice in architecture in Scotland at that time. He pointed to several details as bearing evidence of the structure belonging to the early part of the XIIth century. Special attention was drawn to the doorway newly opened out in the south wall, Mr. Blanc remarking that from the capitals it doubtless formed one of the accesses to the cloister of the original Abbey buildings, and expressing the hope that the doorway would be fully opened out. As to the two niches in the north porch, Mr. Blanc thought they were not likely to have been placed as holy water vessels, as was so often assumed, but to have been recesses cut into the wall, probably for the accommodation of offertory plates. The party were afterwards conducted by Mr. Blanc over the baths and gymnasium, of which he is the architect.

ENGINEERING SOCIETIES.

THE JUNIOR INSTITUTION OF ENGINEERS.—At a numerously attended meeting of this Institution, held at the Westminster Palace Hotel on the 6th inst, a paper on "The Design of a Dry Dock" was read by Mr. A. W. Young, of the Admiralty Works Department (member). The Chairman, Mr. S. Cutler, Junr. M.I.Mech.E, presided. The author dealt with the subject chiefly from the designer's point of view, and further restricted his observations to questions affecting the stability of the structure more than to elements relating to the outline either in plan or profile. The type of dock considered was of the class usually constructed by the Admiralty for the docking of His Majesty's ships, although the diagrams shown did not represent any particular dock. It was pointed out how serious the questions of length, width of entrance and depth over sill for dry docks had become, and, to illustrate the rapid growth of ships in beam and draught during the last sixty years, a diagram was exhibited giving the profiles of ships of sixty years ago and the development of their lines up to the present time. Allowance for future extensions of beam and draught in ships was touched upon, the author stating that this was quite a matter for the naval architect to decide. No matter how long or how broad the docks were made, it really seemed that, directly they were completed, ships were designed that filled them, and so gave cause for reflection as to whether sufficient margin had been allowed, although seeming ample at the time the lines for the docks had been decided on. After these general remarks, the question of the profile was touched upon under (*a*) convenience in docking ships (*b*) space for facilities in carrying out repairs (*c*) restriction of cubic contents as far as possible. Under section (*a*) the spacing of the altars and its bearing on the shoring of the ships was dealt with; under (*b*) the value of the head-room beneath the ship, owing to the very flat bottom of the present-day ships, which head-room affected the level of the floor of the dock in its relation to the level of the entrance sill; and under (*c*) the amount of pumping to be done in emptying the dock. In dealing with the question of stability, the author urged the advisability of making borings to ascertain first the general lie of the various strata, and also of sinking trial pits at intervals for more detailed particulars. Much inconvenience would be avoided by having reliable information as to standing water level and a knowledge of the nature and properties of the ground in which works of magnitude were constructed. The stresses in the walls and floor were fully treated, and their amounts at various points given. Referring to the results and conclusions arrived at he suggested that instead of a beam, the dock floor more nearly approached the form of an arch, but he would prefer to describe it as neither the one nor the other, but rather as "one side of a concrete structure subject to pressures in vertical and horizontal directions simultaneously." To arrive at the section best suited to resist the stresses induced must be by trial and error. If, however, the engineer did not wish to have such thick floors, the system of putting pipes through the floor to relieve the hydrostatic pressure could be adopted, providing the foundations were not of such a character as to be injuriously affected by the water passing through, but an objection to this was the pumping rendered necessary during the time the docks were in use, which, if extensive, would be a heavy annual charge; it, therefore, was a question as to whether the first cost for a thicker floor would not be more economical than paying for the increased pumping. The steps and timber-slides, the drainage-culverts, the pumps, the capstans, and bollards, etc., were referred to, and also the methods adopted in construction and the materials employed. In considering the dock entrance, the parallel-sided caisson by means of which it was closed, was fully described and illustrated by diagrams. The distribution of the loads on the caisson groove from the keel, and the process for finding the centre of gravity and centre of buoyancy were entered into, and remarks made as to the relation those centres bore to each other. The working of the caisson in opening and closing the dock was also considered. The author stated in conclusion that a dock designed as described would cost: For the dock, 225,000*l*., which is equivalent to 22s. per yd. cube, measured externally, or 39s. per yd. cube of internal capacity, or, again, 321*l*. 10s. per ft. cube of dock. Pump wells, culverts, and penstock shafts, 25,000*l*.; engine and boiler house, 18,000*l*.; penstocks, 6,000*l*.; caisson @ 2*l*. 4s. 6d. per ft. super of entrance, 8,000*l*.; total 282,000*l*. The paper was illustrated by a large number of diagrams, and in the discussion which ensued Messrs. Adam Hunter, F. W. Hodgkinson, A. R. Gibbs, R. G. Keevil, L. H. Rugg, J. W. Nisbet, C. W. Pettit, A. W. Metcalfe, G. H. Hughes, and G. W. Brake took part. A vote of thanks having been accorded the author, the meeting closed with the announcement of the visit on the 12th inst. to the Great Northern, Piccadilly, and Brompton Railway Works.

THE SLATE TRADE.—In the Carnarvon district, orders are coming in more freely, and prices are being well maintained. The working of a large area of brown land for slate on co-operative principles is being advocated, but the promoters should bear in mind that the brown land on the Bangor and Festiniog slate veins (on which the paying quarries are situated) has been for many years leased to various companies, and that the area is limited and very well defined.

FABLES FOR CHILDREN IN RESPECT TO THE DANGER OF PLAYING WITH FIRE.—The British Fire Prevention Committee are enabled, through a donation from a Canadian member, to offer the Committee's Gold Medal and a Purse of 20*l*. for the best fable for children, calculated to serve as a warning against the danger of playing with matches or fire. The competition for this prize is open to British subjects resident in any part of His Majesty's dominions, and elementary school teachers are particularly invited to compete. The Executive of this Committee will act as judges, and will be assisted by a public schoolmaster, an elementary schoolmaster, and a schoolmistress as assessors. Two silver and four bronze medals will also be given as additional awards for meritorious essays. The conditions can be obtained at the Committee's offices, 1, Waterloo-place, London, S.W., upon application *by letter* only, enclosing a stamped addressed envelope.

COMPETITIONS.

BATHS FOR CLAPHAM.—The President of the Royal Institute of British Architects has nominated Mr. A. Hessell Tiltman, F.R.I.B.A., as assessor in the competition for the erection of baths at Clapham for Wandsworth Borough Council.

BOOKS RECEIVED.

THE COUNTY GENTLEMEN'S ESTATE BOOK, 1904. Edited and compiled by W. Broomhall. (London: The County Gentlemen's Association, Ltd., 2, Waterloo-place, Pall Mall, S.W.)

THE POCKET BOOK OF REFRIGERATION AND ICEMAKING. Edited by A. J. Wallis-Taylor, C.E. Illustrated. (London: Crosby Lockwood and Son. Price 3s. 6d.)

Correspondence.

STATUTORY QUALIFICATION AND THE R.I.B.A.

SIR,—I find that my name appears in a list of candidates issued to members of the R.I.B.A. by "The London Committee of Members of the Royal Institute of British Architects for the Statutory Qualification of Architects." Will you kindly allow me space to say that I have no connexion with this committee, and that I disapprove of its methods of procedure? So far as I am concerned I trust that members will vote for the men whom they consider best fitted to advance the interests of the Institute, whether their names are included in the circular referred to, or not. JOHN W. SIMPSON.

SIR,—In view of the circular letter, dated 5th inst., issued in the name of "The London Committee of Members of the R.I.B.A. for promoting the Statutory Qualification of Architects," with a list of names approved by that committee as candidates for election to the Council of the R.I.B.A., will you kindly permit me space in the *Builder* to state that, although my name is included in that list, and although, as I at present view the subject, I am in favour of the principle of Statutory Qualification, I am, nevertheless, under no pledge to any person or party, and, as to the future, I reserve absolute freedom of action and discretion in dealing with the subject?

In any case, it appears to me much to be regretted that this question should have been raised as a party cry in the election of the Council at this time, and in advance of the report which we are awaiting from the Committee of the R.I.B.A. upon it. I would add that, had I known beforehand the nature of the circular letter, as issued and expressed, I would on no account have permitted my name to appear in it. WM. H. ATKIN BERRY.

SIR,—I think that most architects will endorse Professor Beresford Pite's remarks in your last issue as to the unwisdom of electing the council upon "planks" or "platforms." As a general practice, I entirely agree with him, but there are exceptions to every rule. Fortunately, in our profession, we do not have many "burning questions," and, under ordinary circumstances, there would be no special reason for disturbing the ordinary, rather humdrum, routine.

Circumstances, however, are not ordinary just now. A question is before the profession which is of the most vital importance to it, and the conduct and treatment of which will have very far-reaching consequences. I venture to think, therefore, that our line of action is both necessary and justified.

I agree also with Professor Pite as to the importance of the personnel of the council, bearing in mind its many and important public duties. The council, including Associate members, numbers twenty-two. We have only nominated seven candidates who have not previously sat upon that body. Even if all of these should be elected, there would still be a balance of fifteen official nominees who might be supposed (taking Professor Pite's standpoint) to be a sufficient leaven. I think, however, that our nominees, whether judged by professional ability, practical capacity, or personal and social position, are certainly equal to the average of the council's nominees.

Referring now to your anonymous correspondent who writes with regard to registration. He frequently speaks of our committee as "Mr. Scott's committee." In justice to its promoters, I should say that it is not my committee. I had nothing whatever to do with its inception, but was invited to join as

a supporter of statutory qualification for the last fifteen years, and I am proud to be its hon. secretary.

Your correspondent says that the Institute communication did not reach us in time for a certain meeting. As a matter of fact, it was never sent to us at all.

With regard to "the one redeeming feature," *three* of our members resigned, not several, after we decided to take the poll. Of these, two have never attended any meetings of the committee at all, and the third did not attend that particular meeting. They were, therefore, not in touch with the motives which prompted us, nor aware of many matters, small, perhaps, in themselves, but which, together, materially influenced our action. Were it advisable to do so, we could easily recruit our committee, not by units, but by hundreds.

We have received about 800 replies to our inquiry. Of these *thirty-seven* are *against* statutory qualification, and the remaining 760 odd are in favour of it. Doubtless more replies would come in if we were to issue a reminder, but it seems unnecessary, as we have already proved the enormous preponderance of feeling in favour of the movement.

We do not agree that we are "prejudicing the question," and, should our nominees be elected, the matter will still be discussed in "the calm, deliberate, dispassionate, and business-like consideration of the whole subject," which, we agree with your correspondent, is the proper spirit in which to consider it.

W. GILLBEE SCOTT.

May 10, 1904.

LONDON'S LEVELS.

SIR,—I was visiting the beautiful library and museum of the Corporation of London, at the Guildhall, the other day, and noticed, before leaving the Basinghall-street doorway, a curious old frame on which are depicted the varying sites and heights of London's "Principal Public and other Edifices above the River Thames." It was compiled by Frederick Wood, 28, Queen-street, Brompton, and William Moffat, 8, Middle-row, Knightsbridge, Land Surveyors, in 1828, and was published in September of that year for the proprietors by J. Gardener, 163, Regent-street, London; and is "Inscribed to the King's Most Excellent Majesty, George the Fourth." In a little square on the space appears the annexed "Example." "The level and place in the landscape of St. Paul's Cathedral being wanted, see under letter S in the alphabetical table, where will be found No. 217, 52.8.40, the first the number of the building in the landscape and numerical table, the second its level; and, by referring to the scale at the side of the landscape between the parallel heights 50 and 60, the Cathedral will be seen delineated. The landscape is divided from O (the high-water mark) into forty-four parallels, each 10 ft. in height, and the difference between the high-water mark and low-water mark is 18 ft."

This survey must have cost its makers much time and thought, and is worthy of a much better light than it mostly gets in the staircase corner.

WAYFARER.

FLOOR FOR DANCING-HALL.

SIR,—Will you, or any of your correspondents, kindly say what is the latest and most up-to-date method of constructing a spring floor for a large dancing-hall or ball-room? Any assistance or advice in this direction will greatly oblige

"Q."

NEW SCHOOLS, HORNSEY.—The opening of the Hornsey Higher Elementary School, the South Harringay School, and the Special Instruction School, in the Mattison-road, Harringay, took place recently. The schools are situated in the Mattison-road, Harringay, and consist of the Higher Elementary School, which has upon the ground floor a hall and classrooms. On the first floor there is a lecture-room, art-rooms, and laboratories. In the special instruction school there is on the ground floor a swimming bath, cookery kitchen, and laundry. On the first floor with an entrance from the playground there is the manual instruction room, and on the same floor, with an entrance on the Mattison-road side, a housewifery room. The South Harringay School (mixed department) comprises on the central floor a large hall and classrooms, and on the first floor, classrooms. There is, in addition, an infants' department attached to the school. In the higher elementary school there is accommodation for 340 scholars, and the cost of building and furnishing is 16,240*l*. In the ordinary elementary school the accommodation is for 900, and the cost of building and fittings 23,035*l*. The cost of the special instruction school amounts to 8,644*l*. Messrs. A. Mitchell and A. M. Butler, of Finsbury-circus, were the architects, and Messrs. McCormick and Son, of Islington, the builders.

The Student's Column.

ARCHES.—XIX.

FROM the preceding articles it must be evident to the reader that in every theory of the masonry arch certain assumptions are necessary, and, as an inevitable consequence, even the most refined mathematical processes can yield no more than approximately accurate results.

Although the stability of, and the strains in, a masonry arch cannot be determined with any close approach to accuracy, it is always possible to make adequate provision for safety by the adoption of ample dimensions. This necessarily precludes the adoption of the most economical designs, but the excess material so employed does not involve much unremunerative expenditure, owing to the comparatively inexpensive character of building stone and materials.

While it is wise to recognise the limitations of any theory, we do not wish for a single moment to disparage theoretical investigations, for these are always invaluable aids. Experience is a poor guide by itself, but studied with the assistance of theory, it becomes of great practical value. In the design of arches experience and theory must go hand-in-hand.

We devote the present article to various empirical rules derived from the study of existing arches. These formulæ will be found serviceable to the designer by assisting him to assume suitable proportions for any proposed arch previous to the application of theoretical tests, and by affording a means of checking dimensions obtained from purely theoretical methods. No formula derived from existing structures can show the degree of safety likely to be attained, and the chief aim of such rules is to indicate safe construction. As numerous arches have been built of excessive strength, many empirical rules lead to the perpetuation of unnecessarily massive construction. Other rules, based on lighter examples, may safely be used in ordinary cases, but as the actual dimensions of an arch do not by themselves afford any true criterion of stability, the designer must invariably take into account such factors as the nature of the loading, the quality, bonding and cementing of the masonry, the character of the earth at the abutments and below the foundations, and the construction and manipulation of the centring.

Fortunately, the failure of arches is of comparatively infrequent occurrence, and when failures do occur they may have little to do with the actual proportions of the structures, and are generally the result of attendant circumstances. Hence, notwithstanding the fact that arch failures are most instructive object-lessons, they do not bring us much nearer to the establishment of general rules for the most economical forms of design. The result is that some approved theory must be applied in the manner discussed in previous articles of this series.

In the following notes we deal with three essential dimensions:—(1) Thickness at the crown; (2) thickness at the springing; and (3) thickness at the abutment.

Thickness of the Arch Ring at the Crown.

To determine the depth and thickness of the keystone is the first step in the design of an arch.

Let t = thickness at the crown, in feet;
ρ = radius of curvature of the intrados, in feet;
r = rise of the arch, in feet; and
s = span of the arch, in feet.

Rankine says that to determine the thickness by direct deduction from the principles of stability and strength would be an almost impracticable problem, and that the best course in practice is to assume a depth for the keystone according to an empirical rule founded on the dimensions of good existing examples of bridges.

The following is his rule:—

"For the depth of the keystone, take a mean proportional between the radius of curvature of the intrados at the crown and a constant whose values are: for a single arch 0·12 ft., and for an arch forming one of a series 0·17 ft."

Hence we have:—

For a single arch, $t = \sqrt{0{\cdot}12\rho}$.

For one arch of a series, $t = \sqrt{0{\cdot}17\rho}$.

For underground archways Rankine adopts a similar empirical rule, also deduced from practical examples.

For a tunnel in ground of the firmest and safest kind the rule is:—

$$t = \sqrt{0{\cdot}12\, r^2 \div s}.$$

For a tunnel in soft and slippery materials the rule is:—

$$t = \sqrt{0{\cdot}27\, r^2 \div s} \text{ to } \sqrt{0{\cdot}48\, r^2 \div s}.$$

Trautwine's rule for the depth of the keystone in a first-class cut-stone arch of circular, or of elliptical, form, is:—

$$t = \frac{\sqrt{\rho + \frac{1}{2}s}}{4} + 0{\cdot}2.$$

For second-class work the thickness so obtained should be increased by one-eighth, and for rubble of fair quality or for brick-work the thickness should be increased by one-third.

Among French engineers, the following rules by Dejardin have found considerable favour. In these the constant is given for various ratios of the rise to the span of the arch. Thus:—

For circular arches:—

Where $\frac{r}{s} = \frac{1}{2}$, $t = 1 + 0{\cdot}10\rho$

$\frac{r}{s} = \frac{1}{6}$, $t = 1 + 0{\cdot}05\rho$

$\frac{r}{s} = \frac{1}{8}$, $t = 1 + 0{\cdot}035\rho$

$\frac{r}{s} = \frac{1}{10}$, $t = 1 + 0{\cdot}02\rho$.

For elliptical and three-centred arches:—

Where $\frac{r}{s} = \frac{1}{3}$, $t = 1 + 0{\cdot}07\rho$.

Croizette-Desnoyers, another well-known French engineer, gives the following rules for the depth of the keystone in arches generally:—

Where $\frac{r}{s} > \frac{1}{6}$, $t = 0{\cdot}50 + 0{\cdot}28\sqrt{2\rho}$

$\frac{r}{s} = \frac{1}{6}$, $t = 0{\cdot}50 + 0{\cdot}26\sqrt{2\rho}$

$\frac{r}{s} = \frac{1}{12}$, $t = 0{\cdot}050 + 0{\cdot}20\sqrt{2\rho}$.

Perronnet, the eminent French authority, followed no fixed rule in the design of his numerous bridges, and varied their proportions according to the quality of the material and the nature of various details. The following formula is generally attributed to him for application to circular and elliptical arches of all kinds:—

$$t = 1\tfrac{1}{12} + \tfrac{1}{12}s.$$

Thickness of the Arch Ring at the Springing.

The thickness of an arch at the springing is usually proportioned in accordance with the position of the line of resistance, obtained by theoretical methods, as already described. In the well-known examples of Stephenson, the thickness of the ring is from 20 to 30 per cent. greater at the springing than at the crown, and in Rennie's bridges the increase is about 100 per cent.

Trautwine's formula for the arch ring at the springing is:—

$$t = 0{\cdot}2\rho + 0{\cdot}1\, r + 2{\cdot}0,$$

where t = the thickness at the springing, ρ = the radius, and r = the rise, all expressed in feet.

The following rule is given by Professor Baker* for the length of the joints between the joint of rupture and the crown:—

"The length, measured radially, of each joint between the joint of rupture and the crown should be such that its vertical projection is equal to the depth of the keystone."

Expressed algebraically this rule is:—

$$l = t \sec\theta,$$

where l = the length of the joint, t = the thickness at the crown, and θ = the angle of the joint with the vertical.

By this formula the thickness of the arch ring can be computed at the *real* springing, which, as we have before pointed out, is at the joint of rupture. Calculation is unnecessary for that part of the arch below the joint of

* "Masonry Construction," p. 499.

rupture if it be supported by solid backing, properly bonded with the arch ring.

The following are values for circular arches :—

$$\text{Where } \frac{r}{s} > \frac{1}{4}, \quad l = 2{\cdot}00\,t$$

$$\frac{r}{s} = \frac{1}{6}, \quad l = 1{\cdot}40\,t$$

$$\frac{r}{s} = \frac{1}{8}, \quad l = 1{\cdot}24\,t$$

$$\frac{r}{s} = \frac{1}{10}, \quad l = 1{\cdot}15\,t$$

$$\frac{r}{s} = \frac{1}{12}, \quad l = 1{\cdot}10\,t.$$

Thickness of the Abutment.]

Rankine says* that in some of the best examples of bridges the thickness of the abutments ranges from one-third to one-fifth of the radius of curvature of the arch at the crown.

Trautwine's formula for the thickness of the arch ring at the springing, $t = 0{\cdot}2\rho + 0{\cdot}1r + 2{\cdot}0$, also applies to the thickness of the abutment at the springing, and is recommended by him for "the smallest culvert or the largest bridge—whether circular or elliptical, and whatever the proportions of rise and span—and to any height of abutment. It applies also to all the usual methods of filling above the arch, whether with solid masonry to the level of the top of the crown, or entirely with earth. It gives a thickness of abutment which is safe in itself without any backing of earth behind it, and also safe against the pressure of the earth when the bridge is unloaded. It gives abutments which alone are safe when the bridge is loaded; but for smaller arches the formula supposes that earth will be deposited behind the abutments to the height of the roadway. In small bridges and large culverts on first-class railroads, subject to the jarring of heavy trains at high speeds, the comparative cheapness with which an excess of strength can be then given to important structures has led, in many cases, to the use of abutments from one-fourth to one-half thicker than those given by the preceding rule. If the abutment is of rough rubble, add 6 in. to the thickness by the above formula, to insure full thickness in every part."†

Fig. 82 illustrates the application of Trautwine's rule for determining the thickness of the abutment at the bottom.

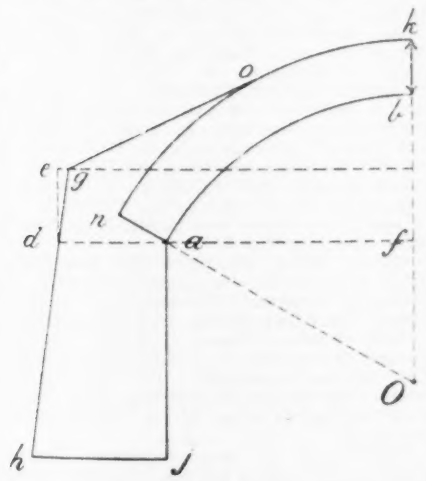


Fig. 82.

With the radius 0 a draw the arc $a\ b$ representing half the intrados of the proposed arch. Compute the thickness t at the springing. Lay off $a\ d$ equal to the thickness t, from d lay off vertically $d\ e$ equal to half the rise $f\ b$ of the arch, and from e lay off horizontally $e\ g$ equal to one-forty-eighth of the span. Then the line $g\ d$ produced downwards gives the back of the abutment, provided the thickness $h\ j$ at the bottom is not less than two-thirds of the height $a\ j$. In very large arches or those with high abutments, it may be necessary to increase the thickness so as to provide for adequate resistance to earth pressure.

Continuing the construction in Fig. 82, we can thus find the thickness of the arch ring and backing.

Determine the thickness at the crown = $b\ k$ by any of the formulæ given above, and draw the curve $k\ n$ parallel to the intrados. From g draw a tangent to the extrados; then $g\ o\ k$ will be the contour of the backing above the arch ring $b\ k\ n\ a$.

*"Civil Engineering," p. 423.
†"Trautwine's Engineers' Pocket-Book."

COURT OF COMMON COUNCIL.

THE usual fortnightly meeting of the Court of Common Council was held in the Guildhall on Thursday last week.

Paving Contracts.—On the recommendation of the Streets Committee it was agreed to extend certain contracts for paving.

It was reported that the following resolution had been received from the Camberwell Borough Council, it having been passed by the Assessment Committee of that Council:—"That this Borough welcomes the proposal of His Majesty's Government to amend the law for the purpose of promoting uniformity of valuation in London, but is of opinion that the Cities of London and Westminster and the Metropolitan Borough Councils should each have the appointment of the Assessment Committees, upon which the London County Council should also appoint one-sixth of the members; the London County Council to have power to make by-laws—to be approved by the Local Government Board, in conjunction with the Treasury—to secure uniformity in practice for valuation purposes, and that the Bill should be amended in its provisions to secure these objects." The resolution was referred to the Improvements and Finance Committee.

ROYAL COMMISSION ON LONDON LOCOMOTION.

AT the sitting of this Commission on Thursday last week evidence was given by Mr. Philip Dawson, M.Inst.M.E., Consulting Engineer to the London, Brighton, and South Coast Railway Company. He considered that "local traffic" in London would be best served by surface lines. Through traffic—traffic between London and the suburbs—worked by a system of electric railways. One great source of trouble to those railways possessing a heavy suburban traffic was the inadequacy of their terminal facilities. The terminal question was most difficult to deal with, both on account of the heavy expenditure which the necessary alterations would entail, and also because of the difficulties of working trains over lines belonging to a variety of companies. He suggested, as a remedy, decentralisation, or the dividing of traffic more evenly between the different termini, by running trains through London over existing lines, and so extending the unloading of trains over a large number of stations, instead of discharging all passengers at a single terminus. Witness described what was done in this direction by the various companies. Dealing with the advantages of electrification of railways, he said that, besides benefitting the public, electrification would be a great advantage to the companies, as electricity was far more economical than steam power. The present steam locomotive cost nearly the same to haul a train of two or three cars as a train of twelve or fourteen cars. Locomotive costs were more or less proportional to the train mileage. Moreover, fuel was being burnt when the train was coasting or stopping. With electrically-worked trains the power taken by the train was proportional to the ton mile, and a train could be split up into units. No energy was consumed except when actually working. Electric traction would double the speed on suburban railways. The people would, therefore, have a far greater choice of residence. If railways electrified their suburban systems the electric tramways would be valuable as feeders.

Mr. Stephen Butler Cottrell, M.Inst.C.E., member of the Association of Railway Locomotive Engineers, and Engineer-in-Chief and General Manager of the Liverpool Overhead Railway Company, described the working of that railway at some length. Coming to a consideration of the traffic problem in London, he advocated the construction of overhead railways to deal with urban traffic. Such railways should be placed where there were back streets, so that their unsightly appearance would not seriously matter, and where compensation would not be a serious item. Unfortunately, such streets were difficult to find, so that for rapid transit communication would have to be either by shallow subway railways or deep-level railways. Shallow subways had the advantage of not requiring lifts, but their construction was not possible in London owing to the nature of the subsoil.

Mr. H. E. Jones, M.Inst.C.E., then gave evidence on behalf of the Gas Companies Protection Association. He did not think that subways were really a way out of the road-opening difficulty. The gas companies should lay larger mains in the first instance.

On Friday evidence was given by Mr. G. F. Foulger, the Distributing Engineer of the Gas Light and Coke Company, who said that the company was the largest undertaking in the world, and served an area of 62¾ square miles. They had 2,078 miles of cast-iron mains, irrespective of the wrought-iron service pipes or house connexions. It was a matter of public knowledge that in the past ten or twelve years there had been a great disturbance of the streets by the laying of pipes. This was not due so much to a company like his, which had been slowly growing for eighty years, but to the laying of distributing plant for the first time of electric lighting companies and local authorities. During 1903 his company had made 21,273 openings in this district, but of these 9,375 were of penny in the slot connexions which were in side streets, and 3,754 were in suburban districts where a service was being given for the first time. He would not be adverse to the proposal that where the local authority was repairing a street a company should be required to do what work was requisite for its service, and should afterwards be prohibited from opening the street for a period of nine months unless they could show good cause to the satisfaction of an independent person.

Professor Kennedy gave evidence on behalf of the ten principal electric lighting companies of London, with regard chiefly to the suggestion that public inconvenience would be minimised, if it were possible when a street was opened for other undertakers to carry out any requisite work at the same time. He said that the principal case in which co-operation might be possible was where the thoroughfare was closed in whole or in part through extensive operations, either of the local authority or of some undertakers carrying out particularly heavy work. To promote co-operation the first necessity was that the different undertakers, whether local authorities, government officials, or public companies, should be put under similar and reciprocal obligations as to the giving of notices. Fourteen days' notice might be given for all new road work and for any pavement work over 20 yds. in length, and these notices should be sent by the local authorities, the Postmaster-General, the gas and water companies, the hydraulic power companies, and the electrical companies. Another method by which inconvenience to the public might be diminished would be the carrying out of the reinstatement of pavement or road surfaces by the undertakers, of course with the approval and under the supervision of the local authority. Suggestions had been made for the use of subways as a means of getting rid of the opening up of the streets, but he did not think that witnesses had fully realised the nature of the problem. Even when practicable at all, the use of subways was absolutely restricted to a few very important thoroughfares, whereas electrical mains covered practically all the streets in the district. Two kinds of subways had been proposed before the Commission. The first was the London County Council type, which was at present used in Northumberland-avenue, Charing Cross-road, etc. He had examined these and thought there was great danger in putting electric-light mains and gas mains within the same limited space. The City of Westminster had suggested the use of subways extending from cellar to cellar, and large enough to provide for tramways, foot-passengers, etc. If the electrical mains could be placed close to the cellar wall, the difficulty of opening up the streets would be overcome, but the question of danger not only remained, but would be seriously increased. As to the practicability of providing one central authority to regulate the breaking up of streets throughout London, after full consideration of this question by the electrical undertakers, they did not think the creation of a central authority would be desirable in itself, or of use to the public. The different local authorities were really the best judges of the times at which each would like work to be carried out in its own district. The borough surveyors were charged with the making and maintenance of the roads, and he admitted that they must be the judges of what was satisfactory and necessary in road surfaces, but he did not admit the desirability of any interference by the borough surveyors or local authorities with the technical work of laying mains.

Mr. John Conacher, General Manager of the Metropolitan Electrical Supply Company, said that the practice with regard to the reinstatement of streets varied in the cases served by his company, and he believed the inconvenience complained of from delay in the

permanent reinstatement by local authorities of both footways and roadways after they had been opened by supply companies would be greatly lessened by the extension and general adoption of an arrangement which existed between the Metropolitan Company and the Borough Council of Paddington and Holborn. In Paddington the council allowed the company to reinstate permanently all footways after mains had been laid, and also all roadways, except where they were paved with wood. The same arrangement existed in Holborn, except that where the paving was of wood or asphalte the council's own contractors were employed by the company, by whom they were paid direct. These arrangements had worked well, and he believed that similar arrangements could be extended to the whole of London with advantage to the public, and without loss to the boroughs. Witness, in other particulars, endorsed the views of the previous witnesses.

WESTMINSTER CITY COUNCIL.

THE usual fortnightly meeting of this Council was held at the City Hall on Thursday last week.

Sanitary Inspectors.—The General Purposes Committee brought up a series of regulations dealing with the duties, etc., of sanitary inspectors employed by the Council, and these were adopted. The regulations provide for the inspectors, when discovering a nuisance on any premises, furnishing a written statement of such nuisance to the person responsible and keeping a duplicate copy of such statement. They will be required to furnish to the Medical Officer of Health, on forms provided, a report on the premises inspected. Their hours of duty are to be nine to five, except on Saturday, when they shall be nine to one. No prosecutions shall be instituted until the matter has first been personally investigated by the Medical Officer of Health.

Widening of Piccadilly.—A letter had been received from the London County Council stating that the question of the possibility of widening Piccadilly between St. James-street and Duke-street to 80 ft. was under consideration. The leases in a large portion of the property are about to expire, and they wanted to know if the City Council were prepared to contribute towards the cost. The Improvements Committee considered that it was advisable, before dealing further with the matter, that a meeting should be held between the Improvements Committees of the two bodies. They recommended accordingly, and this was agreed to.

Gullies and Rain-water Pipes.—The Works Committee reported that clause 3 of the Drainage By-laws of the London County Council specifies that all rain-water pipes shall discharge in the open air, over or into a gully. Difficulty had been experienced in complying with the by-law, owing to the fact that the London Building Act permitted the whole area of the basement and ground floors of any premises to be built upon. The City Engineer had inquired of the London County Council whether a sealed gully within the premises would be deemed a compliance with the by-law, and had received a reply from the Superintendent Architect of the London County Council in the negative.

Bookplate.—It was reported by the Public Libraries Committee that they had accepted the design of Mr. W. W. Burgess, member of the Royal Society of Painter Etchers and Engravers, for an etched bookplate for the libraries in place of the various plates now in use. The design embodies the City Arms within a decorative border. The introductions are the Mitre and Crozier (showing the connexion with the Abbey), the Sword of State with the Orb and Crown (association with Royalty and the Seat of Government), and the Mace of the City. In the corners are the four national badges—the English Rose, the Scotch Thistle, the Irish Harp and the Red Dragon of Wales.

Paving.—The Works Committee reported having had the question before them of the want of repair of the red gum-wood paving in Charing Cross-road, Whitehall, Broad Sanctuary, and Grosvenor-road. The City Engineer had obtained tenders for repairing the pavement, and it was recommended that the Improved Wood Pavement Company should execute such parts of the work as they are in a position to perform, and that the remainder be executed by Messrs. Mowlem and Co.

DURHAM COLLEGE OF SCIENCE.—In our account last week of the foundation-stone ceremony of the extension to this building, it is stated that Mr. W. H. Knowles is engaged in carrying out the designs of Mr. R. J. Johnson. This is not so; the late Mr. Johnson designed the first sections of the college, but the present additions, amounting to 50,000*l.*, are from the designs of Mr. Knowles.

OBITUARY.

MR. G. H. BIRCH.—Just as we go to press, we hear with regret of the death on Tuesday, May 10, of Mr. George Henry Birch, F.S.A., curator of the Soane Museum, in Lincoln's inn-fields, W.C. Next week we shall give some particulars of his career.

MR. NORMAN BROWN.—Mr. Norman Brown, architect, of Newport, has just died at his residence, St. John's-road, Maindee, at the age of forty-one. His plans for the new technical institute for Newport were selected in competition. Up to the present, however, the Corporation has deferred proceeding with the building.

ALDERMAN G. THACKRAY.—The late Alderman George Thackray, of Huntingdon, whose death took place on May 3, was born at Godmanchester, in 1834, and entered into partnership with his father in the building trade in 1855, which partnership continued until 1868. From this time until 1881 he directed the business himself, and with much success. In 1881 he took into partnership his eldest son, Mr. F. B. Thackray, who still manages the works in course of erection by Messrs. F. B. Thackray and Co., Ltd. He entered the Town Council of Huntingdon in 1874, was eventually elected an Alderman of this body, of which he was three times the head as Mayor. He was one of the first elected members of the County Council. This body also appreciated his public work by making him an Alderman of the County of Huntingdon. He was a Justice of the Peace for the County of Huntingdon, and was a guardian of the poor, etc. The deceased married the daughter of the late Mr. J. Bayliss, of the Foundry and Engineering Works, Huntingdon, and he leaves behind him six sons and four daughters.

MR. OLIVER.—We have to announce the death, a few days ago, of Mr. Edmund John Oliver, of No. 2, Fore-street, Bodmin, aged eighty-four years. Until his retirement in 1902, Mr. Oliver had been, during a period of twenty years, Surveyor and Sanitary Inspector to the Borough, and, on his resignation, was appointed Consulting Surveyor to the Urban District Council. He designed the buildings for the new cattle market at West Heath, Bodmin, opened in September, 1901; and was architect of the Lady Huntingdon's chapel in Fore-street, built in 1871.

GENERAL BUILDING NEWS.

CHURCH, HUDDERSFIELD.—The new Church of St. Matthew, erected at Primrose Hill, Huddersfield, was on Saturday last opened for public worship. The building is situated in Orchard-street, the whole having a total length of 100 ft., the width of the nave being 31½ ft., with narrow aisles. In the basement is a church council-room or choir vestry. The supervision of the work has been in the hands of Mr. J. William Cocking, of Huddersfield, the architect. The church is of broken random coursed walling inside and out, with hammer beam pitch-pine and Burlington blue slated roof. The whole of the interior wood and stone work is in the natural state. The accommodation is for about 360.

RESTORATION OF PARISH CHURCH, ISLINGTON.—The new chancel and the improvements to the nave which have been carried out in connexion with the Islington Parish Church have now been completed. The work has been executed from the plans prepared by Sir Arthur Blomfield and Sons, architects, by Messrs. Dove, builders, at a cost of 14,000*l.*

NEW CHURCH, STRATFORD-ON-SLANEY, IRELAND.—The new parish church of St. John, Stratford-on-Slaney, was recently opened. The work has been carried out from the designs of Mr. J. F. Fuller, architect.

SHIREBROOK CHURCH, NOTTS.—The church at Shirebrook, Notts, which has been enlarged, was recently re-opened. The new edifices consists of a nave, and the old church has been thrown into the new as a south aisle. The whole building gives seating accommodation for 800 persons, as against 200 formerly. A temporary chancel has been erected until funds permit the scheme to be carried out in its entirety. The architect was Mr. H. J. Price, Nottingham, and the general contractors were Messrs. Fisher Brothers, Mansfield. The walling has been built by Messrs. Wilkinson and Son, of Bulwell; heating and electric installation, Messrs. Thomas Danks and Co., Nottingham. Messrs F. Smith and Co., of London, are responsible for the temporary chancel; slating, Mr. A. Wright, Nottingham; oak seating, Addison and Co., Wellington, Salop. The general foreman of the works was Mr. W. Avery, and the cost of the work has been about 4,000*l.*

CHANCEL SCHEME, PARISH CHURCH, BRIGHOUSE.—A new chancel is being added to the Parish Church, Brighouse. The work is being carried out from designs prepared by Mr. C. Hodgson Fowler, architect.

NEW WESLEYAN CHAPEL, OLD CHESTERTON, CAMBRIDGE.—The foundation stones of a new Wesleyan chapel in Church-street, Old Chesterton, were laid recently. The architect is Mr. W. Wren, of Mount Pleasant, and the builders are Messrs. Kerridge and Shaw, of Cambridge. The cost of the work will be about 1,100*l.*

WESLEYAN CHURCH, SALTLEY, BIRMINGHAM.—The foundation stones of a new Wesleyan church, to be erected in Alum Rock-road, Saltley, were laid recently. The new edifice will afford accommodation for about 900 worshippers, and is estimated to cost about 4,500*l.* The main entrance from Alum Rock-road will be formed by two archways opening into a vestibule admitting into the body of the church. There will be separate entrances to the galleries, which will be approached by four staircases. The construction of the building will be of red brick with terra-cotta facings, the internal appearance of the church being enhanced by two rows of buff terra-cotta columns and arches carrying an open timber roof, the columns at the same time supporting the galleries. Mr. Arthur Harrison is the architect.

BAPTIST CHURCH AND SCHOOLS, GLOUCESTER-PLACE, BRIGHTON.—The opening ceremony of the new Baptist church and schools at Brighton took place on the 11th inst. The church is faced with whole white flints, with red dressings. The heating is by hot water. Electric light is provided. Accommodation—443 adults on ground floor, 282 in galleries; total, 725; or a mixed congregation of over 800 persons. Seating is arranged semi-circularly on plan; the ceiling is vaulted, and there are three vestries. There are schools for 500 scholars under the church, with various classrooms to the same. The front consists of three entrances, a large central gable, with five-light traceried window in the gable, with a tower on one side, terminated by a spirelet covered by oak shingles, with wrought-iron vane. Messrs. George Baines and R. Palmer Baines, Clement's Inn, London, W.C., are the architects, and Messrs. Battley, Sons, and Holness, Old Kent-road, London, S.E., the builders, the contract amount being 5,381*l.*, exclusive of galleries (except choir gallery) and upper portion of tower.

BAPTIST CHURCH, KILBARCHAN.—The new church erected by the Baptist Union of Scotland was opened on the 7th inst. The church, which is situated in the centre of the village, is seated for 400, and is of Gothic design, the outer walls being rough cast and the roof red tiled. There is also a hall capable of holding 200 persons, and a house for the church officer. The cost of the building, excluding the pipe organ, is 2,400*l.* The church was built from the designs of Messrs. A. and D. Barclay, Glasgow, and the general contractor was Mr. John Woodrow, Bridge of Weir. The pipe organ has been built by Messrs. R. Smith and Co., Glasgow.

HALL, DUNBLANE CATHEDRAL.—On the 22nd ult. a new hall for the Dunblane Cathedral congregation was opened. It is a building in the Scottish domestic style, and was designed by Sir Rowand Anderson, LL.D. It is in harmony with the buildings in Cathedral-square, and a contrast to the Cathedral. It is seated for nearly five hundred. It has cost with furniture 4,000*l.*

CHURCH HALL, HASWELL.—The new Church Hall, at Haswell, was opened recently by the Bishop of Durham. The building is from the plans of Mr. George Fox, architect, of London.

NEW SCHOOL, DERRY, IRELAND.—The new Strand House School in Asylum-road, Derry, has just been completed. The work has been carried out by Mr. R. Colhoun, builder, from the designs of Mr. M. A. Robinson, the architect.

EXTENSIONS TO THE ABERDEEN GRAMMAR SCHOOL.—The plans for the extensions of this school, prepared by Mr. J. A. Ogg Allan, architect, the master of works for the Aberdeen School Board, have now received the sanction of the Scottish Education Department. The cost of the proposed improvements is estimated at about 5,000*l.*

SCHOOL, HEWORTH.—The new Council school at Heworth was opened on the 2nd inst. by Mr. Francis Hogg, Chairman of the Education Committee. The building has been erected from designs prepared by H. Miller, architect, Felling, and the contractors were Messrs. Glen and Moffett, Jarrow.

READING ROOM, CADOXTON.—The formal opening of the new public reading room, erected on a freehold site belonging to the Barry District Council, at Cadoxton Common took place recently. The contract has been executed by Messrs. Gibby and Cleak, of Barry Dock. The architects are Messrs. Speir and Bevan, of Cardiff. The contract price was 1,025*l.*

NEW BANK PREMISES, WOOLER, NORTHUMBERLAND.—The new premises at Wooler, erected for a branch office for Messrs. Lambton,

bankers, have been opened. The building stands on a site at the corner of High-street and Glendale-road. The plans were prepared by Mr. Rich, architect, Newcastle, the contractor being Mr. John Todd, Wooler.

MEMORIAL HOMES, BURY ST. EDMUNDS.—Two cottage homes for old soldiers of the Suffolk Regiment, which have been erected at Bury St. Edmunds in memory of Prince Christian Victor, were opened recently by Princess Christian. The homes have been built from designs by Mr. A. Ainsworth Hunt, of Bury St. Edmunds, architect and surveyor to the West Suffolk County Council, who acted as honorary architect. The building is in the Elizabethan style, of red brick and Broseley tiles, and in front, above the principal doorway, are the arms of the regiment with the date of the erection of the homes carved on a panel of Portland stone. The cottages consist of two suites of apartments, each consisting of a sitting-room, a kitchen and scullery, and three bedrooms. There is also a plot of garden attached to each. The builders were Messrs. Barbrook and Houghton, of Bury St. Edmunds.

NURSES' HOME, DUBLIN.—The James Weir Nurses' Home, in connexion with the House of Recovery and Fever Hospital, Cork-street, Dublin, was opened on the 6th inst. The building was erected and equipped by Messrs. H. and J. Martin and Mr. Howard M'Garvey, to the designs of Mr. W. M. Mitchell, R.H.A., and under the supervision of Mr. Patrick Hynes, the clerk of works.

NEW ALMSHOUSES AT WHIRLOW BRIDGE, SHEFFIELD.—These buildings have been erected for the Hollis Trust in three blocks. The central administrative block, which faces due south, contains, on the ground floor, a large combination room for the inmates, about 30 ft. by 26 ft.; and the superintendent's house, with parlour, and the usual offices. There is also contained on this floor accommodation for four inmates. Each inmate is provided with a living-room 15 ft. by 12 ft., with a bed recess, and with a bay window in addition to the above dimensions. There is also provided a scullery and coal bunker. The living-room is fitted with a Yorkshire range, so that each inmate can cook for herself. On the upper floor of this block there is accommodation for four more inmates, with bath-room in addition. The northern half of this floor is occupied by the superintendent's bedrooms and bath-room; and over the combination room, a sick-room and nurses'-room is provided. In the east and western blocks, which are one-story buildings, accommodation is provided for four inmates in each, making a total number of sixteen inmates. A small separate building contains a large wash-house fitted with coppers for the use of the inmates. The buildings have been built in local red bricks, and roofed with Broseley tiles. The plinth of the buildings has been executed in stone; and the gables and bay windows are finished in rough cast and oak timber quartering. The premises are finished internally in a simple manner, the whole of the rooms being plastered, and having wood floors, except the sculleries and halls, which are tiled. Gas has been laid on throughout the premises. The combination room has been made as comfortable as possible, with window seats; and by a French casement a small verandah is reached, facing due south, for the inmates' use. The drainage has been carefully executed, and the town water is laid on to the premises. The buildings have been erected by Messrs. W. and A. Forsdike, of Sheffield, from designs and under the superintendence of the architect, Mr. Howard Chatfeild Clarke, of Bishopsgate-street-within, London, Mr. R. Dale acting as clerk of works.

APPOINTMENTS.

UNITED GRAND LODGE OF ANCIENT FREE AND ACCEPTED MASONS OF ENGLAND.—His Royal Highness the Duke of Connaught, Grand Master, has been pleased to re-appoint, for the seventh year in succession, Mr. H. L. Florence to the office of Grand Superintendent of Works.

ST. SAVIOUR'S, SOUTHWARK.—Some American residents in London are about to collect a fund for the insertion of stained glass in the window of the vestry of the Church of St. Saviour's, Southwark, as a memorial to John Harvard. He was the son of Robert Harvard, who lived in a house opposite Boar's Head-court, close by the church; the register contains an entry of his baptism in the church on November 29, 1607. Having become a Puritan minister, Harvard emigrated to America and bequeathed a legacy to the school at Newton or Cambridge, which was afterwards reconstituted as a college under the name of the founder. The design of the window will, we are informed, be entrusted to Mr. Kempe.

MISCELLANEOUS.

SOUTH-WESTERN POLYTECHNIC.—On Friday evening last week the prizes and certificates gained by students of the South-Western Polytechnic, Chelsea, were distributed by Earl Cadogan, who also opened the additional buildings which have been recently erected. During the last session upwards of 1,000 students entered the various departments of the day classes, and 6,150 entered those of the evening classes, the numbers in each case showing a substantial advance over the previous session. In the examinations of the London University, four students passed the matriculation in the first division, five the intermediate science, one the intermediate engineering, and eight took their final degree as Bachelors of Science. The silver medal of the Board of Education for the National Competition in Art and a Senior County Scholarship of the Technical Education Board of the London County Council were conferred on students of the Polytechnic, two of whom also passed to Associateship in the Sanitary Institute. The new buildings have been erected from plans prepared by Mr. F. G. Knight, partly on ground available in the centre of the site and partly at the north and west sides of the Institute. Some of the work carried out has been of the nature of an alteration to the original buildings, rendering possible re-arrangements of certain departments, which will have the effect of greatly increasing the facilities for study, more especially for practical work. The additions include a great hall, bricklayers' workshop, plasterers' workshop, photographic rooms, boiler house, extensions to the mechanical and electrical laboratories, and wiring shop. The cost of the work (about 12,000*l.*) has been provided by grants from the late London Technical Education Board (who also provided nearly 6,000*l.* for the equipment of the buildings) and the Trustees of the London Parochial Charities.

ROYAL ORTHOPÆDIC HOSPITAL, OXFORD-STREET.—The hospital premises Nos. 297, Oxford-street and 15, Hanover-square are in course of being demolished, having been vacated on Lady-day. The governors have made arrangements for an amalgamation, under one charter of incorporation and one committee of management, with the National Orthopædic Hospital, No. 234, Great Portland-street, W., where upon some adjoining land they intend to build a hospital to accommodate 200 beds. They will also establish a branch hospital for 100 beds, in the north of London, for the treatment of special cases. Meanwhile they will occupy temporary premises at No. 55, Bolsover-street, W. The Royal Orthopædic Hospital, founded in 1838, was opened in Oxford-street in 1854. The freehold site extends over a total area of about 6,800 ft. superficial, in respect of which the Charity Commissioners made an order in July, 1902, to enable the trustees of the Charity to grant a building lease for a term of ninety-nine years at an annual rent of 1,400*l.*, the lessees agreeing to expend not less than 20,000*l.* upon new buildings, and having an option to purchase the freehold within three years for 40,000*l.*

TWO HOMES OF WILLIAM WILBERFORCE.—Broomwood House in Broomwood-road, on the western side of Clapham Common, has just been demolished, and the site will be occupied by a block of residential flats. William Wilberforce lived in the house in 1797-1808, during which interval his labours for the suppression of the slave-trade in the West Indies, and for other philanthropical objects, were rewarded with success. On May 10 will be offered for sale at the Mart a freehold estate of 192 acres at Hendon, known as Hendon Park, where Wilberforce at one time resided before he removed into London.

LIBERIAN TIMBER.—Mr. Errol MacDonell, British Consul at Monrovia, writes that, owing to the density of the forests and the lack of means of transport, very little is known of the timber and hardwoods of Liberia. Many woods of extreme durability and beauty are used for local building and furniture making, and, if properly treated, would undoubtedly have a commercial value. The bastard mahogany, ebony, and other African trees are well grown and abundant, and at some future date, when the vast primeval forests of Liberia are opened up, they will prove a source of revenue to the country.

ELECTRIC LIGHTING INQUIRY, CARNARVON.—An inquiry was held at Carnarvon on the 20th ult. by Mr. Malet, C.E., Inspector of the Local Government Board, into an application by the Corporation for sanction to borrow 17,000*l.* for the purpose of an electric lighting scheme. In the course of the inquiry, Mr. T. P. Wilmshurst, electrical engineer, Derby, gave evidence as to the objections to the scheme proposed by the North Wales Electric Power and Traction Company, which he considered would be very dangerous to life.

MASTER PLUMBERS' CONFERENCE.—The ninth annual conference of the National Association of Master Plumbers of Great Britain and Ireland was held at Southport on May 9, Mr. T. A. Armitage, Huddersfield, presiding. There were 150 delegates present from London and other large centres, including Staffs. and Yorks., the Association numbering 1,400 members. Councillor J. Boyd, Southport, referred to the great improvements that had of late been effected in sanitation, and matters affecting the plumbing and building trades. An inefficient plumber was, he said, a dangerous member of society, and the Association wished to make it impossible that there should be an ignorant, bungling plumber in existence. The Mayor of Southport (Councillor F. W. Brown) welcomed the delegates, and encouraged a form of decorative plumbing, which, he said, had lately been revived. Mr. Armitage, in his presidential address, said he was sorry that the question of co-ordination of examination had not been settled yet to their satisfaction, as there should only be one examining body throughout the country instead of two. He announced that Mr. Tonge, of Rochdale, had generously given some gold and silver medals for papers by members or their sons, and the competition would start at once. In the matter of the direct tendering to architects, they wished more success than at present. The heating and domestic engineers were forming an association in hostility, but they (the plumbers) were taking a determined stand on what was plumbers' work, and insisted that they were the people to do it. Mr. W. Jaffrey, Manchester, was elected President for the ensuing year; Mr. John Beal, Hull, secretary; Mr. A. B. Dyson, Halfax, treasurer. Mr. C. Thomerson, London, was elected on the Educational Committee. It was resolved that the August Central Board meeting be held at Chester, and the November half-yearly meeting at Bradford.

SANITARY OFFICERS.—The Local Government Board has sanctioned the following appointments:—Battersea—Mrs. A. C. Young, as an additional female sanitary inspector; Deptford—Mr. S. D. Wright, as an additional sanitary inspector; Hackney—Miss A. M. Newton, as an additional female sanitary inspector.

WORKMEN'S DWELLINGS, EXETER.—Mr. R. H. Bicknell, M.Inst.C.E., held an inquiry at Exeter on the 5th inst., on behalf of the Local Government Board, into an application made by Exeter City Council to borrow money for the provision of dwellings under part III. of the Housing of the Working Classes Act, 1890, for the accommodation of inhabitants of one side of Alphington-street, who are to be dispossessed of their dwellings, which are to be removed in order to make room for the St. Thomas improvement. The Council desired to appropriate land in Commercial-road. The Town Clerk (Mr. G. R. Shorto) stated that the area of the district was 3,358 acres, and the population at the last census 47,180. The total rateable value of the city was 250,073*l.*, assessable value for the borough rate, 249,686*l.*, and for the general district rate, 240,130*l.* The amount desired to be borrowed was 20,000*l.* Under the Exeter Corporation Act of 1902 the Council were given power to widen Alphington-street, and on the carrying out of the improvement a number of the working classes would be dispossessed of their dwellings.

WAR MEMORIAL, EARLEY.—A tablet was recently unveiled in the Parish Church, Earley, in memory of the men from that district who fell in the South African war. The tablet, which has been placed on the wall to the right of the chancel arch and near the lectern, is of gilt bronze, with embossed border and lettering. It has been designed and executed in beaten work by Mr. Bertram Reynolds, of Westminster.

CAPITAL AND LABOUR.

DUNDEE MASONS' WAGES.—A meeting of representatives of masters and operative masons in Dundee was held on the 5th inst. to consider the wages question. It was intimated that, in view of the present state of trade, the masters were not prepared to renew the present agreement, but that no reduction would be made meantime.

TEES-SIDE BUILDING DISPUTE.—There seems to be every probability that the struggle between the master builders of Tees-side and the Hartlepools and the bricklayers, plasterers, and their labourers is going to be a keen and determined one. Negotiations between the two parties have come to an end, and it will be remembered that a week ago the men came out on strike, refusing the employers' offer to extend the notice for a week whilst negotiations were continued. The employers at a recent meeting decided to throw open their shops on May 9 to any workmen at the following rates:—Bricklayers, 9½d. per hour; plasterers, 9½d.; bricklayers' labourers, Stockton, 6½d.; Middlesbrough,

6½d.; the Hartlepools, 6½d.; plasterers' labourers, Stockton, 6½d.; Middlesbrough, 6½d.; Hartlepools, 7d. The bricklayers, plasterers, and labourers of the Hartlepools, who were served by the master builders with a notice for reduction in wages, but whose notice was subsequently extended for a week, in view of the possibility of a settlement, will probably join in the general strike which has taken place on Tees-side, all efforts to effect a settlement having proved futile.—*Darlington Star.*

Legal.

COLLS *v.* HOME AND COLONIAL STORES, LTD.

THE following are the concluding judgments in this important case.*

Lord Davey: My Lords,—I am of opinion that the finding of the learned Judge who tried this action as to the facts of this case is borne out by the evidence, and I accept his finding as the basis of my judgment. After describing the dimensions of the room on the ground floor of the plaintiff's premises which is used as an office, Mr. Justice Joyce says:—"It is, I think, the result of the evidence that it has ordinarily, if not always, been the practice to make use of the electric light in the back part of the room, and a most extraordinary amount of light from the windows in Worship-street would be required to enable the use of the electric light in the back part of the room to be dispensed with, even on ordinary days. Practically, I think it may be taken that the use of electric or some other artificial light is now and must always be necessary in order to light the back part of the room, even in the daytime. There is no evidence to show that such an extraordinary amount of light has been enjoyed or acquired for anything like the period of twenty years." And the learned Judge sums up his finding in these words:—"Apart from any question with respect to the back part of the plaintiff's premises and to the extraordinary light required, if it be possible to be obtained so far back in the absence of illumination by electric light, the plaintiff's premises would still, in my opinion, after the erection of the defendant's building be well and sufficiently lighted for all ordinary purposes of occupancy as a place of business. For all ordinary days they have ample sufficient light—at present they have abundance of light, and are, in my opinion, unusually well lighted. If, as it is contended on behalf of the plaintiffs, they are entitled to the full amount of light now enjoyed without appreciable diminution, the plaintiffs would have a good cause of action upon the erection of the defendant's building, though it might perhaps be doubted whether the diminution that would be caused by the defendant's building if and when erected is sufficiently serious to entitle the plaintiffs to an injunction."

On these findings the learned Judge, following the judgment of Mr. Justice Wright in Warren *v.* Brown, which had not then been reversed by the Court of Appeal, held that the action failed and must be dismissed. The Court of Appeal reversed this judgment. The legal grounds of their judgment are contained in a single sentence. "If ancient lights," says Lord Justice Cozens-Hardy, "are interfered with substantially, and real damage thereby ensues to tenant or owner, then that tenant or owner is entitled to relief." By the expression "interfered with substantially" I understand the Lord Justice to mean "if the amount of light having access to the premises by means of the ancient lights is substantially diminished." This proposition appears to me to assume or imply that the owner of the dominant tenement is entitled to have the full amount of light which has gained access to the tenement by the ancient windows during the previous twenty years maintained without substantial diminution. The "real damage" may be occasioned by an alteration in the internal structure of the dominant tenement which has been made within the period of twenty years or its adaptation within that period to some special use for which an extraordinary amount of light is required, but, nevertheless, if the proposition be sound, the owner or occupier of the tenement is entitled to be protected in the enjoyment of the light required for his altered premises or for the special use to which he has put them. In perfect consistency with this view of the law, Lord Justice Vaughan Williams expressed a doubt whether the rule of 45 degrees can any longer be applied even as a rough measure.

The question for your Lordships to determine is whether this view of the law is correct, or, in other words, what is the true nature and extent in English law of the easement of light. It must be regretfully admitted that the numerous decisions on this subject in the courts are not easily reconcilable and are not infrequently contradictory. No judgment of this House has been referred to, except that in the case of Jones *v.* Tapling (2 H.L. 290), the decision in which does not directly affect the point now before your Lordships. I do not propose to travel through the long catena of authorities. They were copiously referred to at the Bar, and the principal cases are stated and carefully analysed in the judgment of Mr. Justice Wright in Warren *v.* Brown.

My Lords, you will find that in the earlier authorities the obscuration of light to a tenement having ancient lights is dealt with on the footing of a nuisance. In Alfred's case (9 Co. 57A) the "hindrance of light" is treated in the same category as the nuisance of fouling the air by pigstyes. In the Fishmongers' Company *v.* East India Company (1 Dick 153) Lord Hardwicke said, "As to the question whether the plaintiffs' messuage is an ancient building so as to entitled them to the right of the lights, and whether the plaintiffs' lights will be darkened, I will not determine it here, for if it clearly appeared that what the defendants are doing is what the law considers as a nuisance, I would put it in a way to be tried. . . . But I am of opinion that it is not a nuisance contrary to law, for it is not sufficient to say it will alter the plaintiffs' lights, for then no vacant piece of ground could be built on in the City, and here there will be 17 ft. distance, and the law says it must be so near as to be a nuisance. It is true the value of the plaintiffs' house may be reduced by rendering the prospect less pleasant, but there is no reason to hinder a man from building on his own ground."

Consistent with this view is the direction of Best, C.J., to the Jury in the oft-quoted case of Back *v.* Stacey (2 Car. and P. 465). The learned Judge said, "It was not sufficient to constitute an alleged obstruction that the plaintiff had, in fact, less light than before, nor that his warehouse, the part of his firm principally affected, could not be used for all the purposes to which it might otherwise be applied. In order to give a right of action there must be a substantial privation of light sufficient to render the occupation uncomfortable, and to prevent the plaintiff from carrying on his accustomed business (that of a grocer) on the premises as beneficially as he had formerly done." In Clark *v.* Clark (L.R. 1 Ch. 15), Lord Cranworth stated the question thus:—"Whether the obstruction is such as to deprive the party of such a supply of light as he might reasonably calculate on enjoying." After saying that the plaintiffs' rooms were rendered less cheerful, he adds, "but I cannot think that this is such an obstruction of light as to amount to a nuisance. . . . What the plaintiff is bound to show is that the buildings cause such an obstruction of light as to interfere with the ordinary occupations of life." In Robson *v.* Whittingham, decided in the following year (L.R. 1. Ch. 442), the Lords Justices Knight, Bruce, and Turner expressed themselves as entirely satisfied with Lord Cranworth's judgment, and Lord Justice Turner accentuated his approval by saying that he thought this class of cases had been carried too far before the decision in Clark *v.* Clark was pronounced. Nothing that I can say will add to the respect and authority with which the opinions of those two learned and experienced Judges must command with your Lordships.

It has been thought that the third section of the Prescription Act (2 and 3 Wm. 4, c. 71) altered substantially the previously existing law as to ancient lights, and had the effect of conferring on the owner of the dominant tenement, by twenty years' enjoyment, an absolute and indefeasible right to the full amount of the light enjoyed during that period. And it must be admitted that the language of the section lends some plausibility to that opinion. It is, however, not consistent with the language of Lord Cranworth in Clark *v.* Clark, and the point was expressly determined by the Lords Justices James and Mellish in Kelk v. Pearson (L.R. 6 Ch. 809), decided by them in the year 1871.

Lord Justice James there says:—"I am of opinion that the statute has in no degree whatever altered the pre-existing law as to the nature and extent of this right. The nature and extent of the right before that statute was to have that amount of light through the windows of a house which was sufficient, according to the ordinary notions of mankind, for the comfortable use and enjoyment of that house as a dwelling-house, or for the beneficial use and occupation of the house if it were a warehouse, shop, or other place of business. That was the extent of the easement, a right to prevent your neighbour from building on his land so as to obstruct the access of sufficient light and air to such an extent as to render the house substantially less comfortable and convenient." The statute, in fact, has only altered the conditions or length of user by which the right may be acquired, but not the nature of the right.

In the case of the City of London Brewery Company v. Tennant (L.R. 9 Ch. 212), Lord Selborne expressed his complete adherence to the view of the law taken in the case of Kelk *v.* Pearson, correcting some impressions which might have arisen from the language used in some former cases by some learned Judges. This doctrine, however, has not been unchallenged. In an Irish case of Mackey *v.* Scottish Widows' Society (Ir. Rep. 11, Eq. 541), decided in 1877, Lord Justice Christian criticised in vigorous language the judgments of Lord Justice James and Lord Selborne, and held that the right is to an average maximum of the light which nature has been shedding upon the window for twenty years before the defendant interrupted it. It is also difficult to reconcile the language used by the Lords Justices Cotton and Bowen in the case of Scott *v.* Pape (31 Ch. D. 554), or the language of the Queen's Bench Judges in Moore *v.* Hall (3 Q.B.D. 178), with the decisions in Kelk *v.* Pearson and City of London Brewery Company *v.* Tennant, though the authority of those cases was not in terms questioned by them.

My Lords, I regard the decisions in Kelk *v.* Pearson and the City of London Brewery Company *v.* Tennant as complementary to, and on the same lines with, Lord Cranworth's judgment in Clark *v.* Clark. And so regarding it, I entirely approve of it. Lord Justice Romer, however, in delivering the judgment of the Court in Warren *v.* Brown (1902, 1 K.B. 15), seems to have taken a different view of the effect of Kelk *v.* Pearson. He says:—"Since Kelk *v.* Pearson it is impossible to hold properly that the statutory right is not interfered with merely because after the interference the house comes up to a supposed standard as to what a house ordinarily requires by way of light for purposes of inhabitancy or business," and he quotes some words used by Lord Justice Mellish at p. 814 of the Report.

I must remark that the particular point which was under discussion in Warren *v.* Brown, and in another form in the present case, was not before the Court in Kelk *v.* Pearson. There was no question there of a claim for protection in the use of an extraordinary amount of light required for some special purpose, or required for some unusual peculiarity in the internal structure of the building. And I regard what was said by Lord Justice Mellish as directed to the arguments addressed to the Court in that case. According to any standard short of holding that the right is to all the light which has come through the window, the right to light has a ragged edge to it, and it is impossible to assert that any man has a right to a fixed amount of light ascertainable by metes and bounds. I do not think that Lord Justice Mellish intended to differ from Lord Justice James, and in the City of London Brewery Company *v.* Tennant, when Lord Justice James repeated the substance of what he had said in the earlier case, Lord Justice Mellish, according to the report, contented himself with a simple concurrence.

My Lords, I must trespass on your indulgence for a few moments by adverting to an impression which has been entertained by some distinguished Judges, and was the subject of argument at the Bar, to the effect that within the space of a few months Lord Cranworth overruled himself. The judgment in Clark *v.* Clark was delivered on November 25, 1865, and that in Yates *v.* Jack was delivered on March 24, 1866. It was thought by Lord Chelmsford in Calcraft v. Thompson (15 W.R. 463) that the effect of the later case was to hold the dominant tenement entitled to the whole light that had previously been enjoyed, and V.C. Wood, in Dent *v.* Auction Mart Company (L.R. 2 Eq. 238), to a certain extent shared the same impression. There is not a hint in the judgment in Yates *v.* Jack which indicates that Lord Cranworth thought he was departing from the law as laid down in his earlier judgment. Both cases were decided and probably reported before Robson *v.* Whittingham, but the Lord Justices, as we have seen, adopted Clark *v.* Clark as an authority which had their approval. And, if the question at issue in Yates *v.* Jack be looked at, it will be seen that the argument to which Lord Cranworth's judgment was directed was that it was not necessary for the plaintiff to have the ordinary quantity of light because the business which they were carrying on required a diminished quantity only. That was the argument to which Lord Cranworth could not accede. So understood, and reading it by the light of Clark *v.* Clark, I do not dissent from the language used by Lord Cranworth in

* See our last issue, p. 501.

Yates *v.* Jack:—"The right conferred by the statute is an absolute indefeasible right to the enjoyment of the light without reference to the purposes for which it has been used." Your Lordships were told, and my experience at the Bar confirms it, that the order made in Yates *v.* Jack has been adopted as a common form of order in cases of this description. I think this is unfortunate. It was a very proper order to make in that case, and in nineteen cases out of twenty, or perhaps ninety-nine out of one hundred, where no question arises such as that in the present case, it would be sufficient and appropriate. But it is an erroneous proceeding to deduce an absolute rule of law from the form of an order made in a particular case.

In Lanfranchi *v.* Mackenzie (L.R. 4 Eq. 421) V.C. Malins held that a person could not by using the dominant tenement for a period less than twenty years for some special purpose requiring an extraordinary amount of light in excess of what was required for the ordinary purposes of inhabitancy or business, entitle himself to protection for such extraordinary requirements, and thereby impose an additional restriction on his neighbour's use of his own land. In that case, as in the present one, it was not proved that the extraordinary amount of light had been used for twenty years. "No man," said the Vice-Chancellor, quoting the words of another Judge, "can by any act of his own suddenly impose a new restriction on his neighbour." In their judgment in Warren *v.* Brown (1902, 1 K.B. 35, at p. 24) the Court of Appeal dissented from this decision, and their opinion was a logical conclusion from the views which they expressed as to the nature and extent of the easement. My Lords, I do not concur with the opinion of the Court of Appeal, for I think that the case of Lanfranchi *v.* Mackenzie was rightly decided. I agree with the Vice-Chancellor that it would be contrary to the principles of the law relating to easements that the burden on the servient tenement should be increased or varied from time to time at the will of the owner of the dominant tenement. The easement is for access of light to the building, and if the building retains its substantial identity, or if the ancient lights retain their substantial identity, it does not seem to me to depend on the use which is made of the chambers in it, or to be varied by any alteration which may be made in the internal structure of it. I do not propose to discuss at length the question how far a variation in a tenement will destroy an easement appurtenant to it. The law on that subject is as old as Luttrell's case (4 Co. 86a).

In the case of Martin *v.* Goble (1 Camp. 320) a malthouse had been converted into a workhouse, and it was held that the house was entitled to the degree of light necessary for a malthouse, not for a dwelling-house. That case has been the subject of much criticism, and I think that some Judges have thought that the language of the Lord Chief Baron had a wider scope than it was intended to have. Following the suggestion of Vice-Chancellor Wood it may be supported on the ground that (to use the language of Luttrell's case) the alteration affected the substance and not only the quality of the tenement.

But while agreeing that a person does not lose his easement by any change in the internal structure of his building or the use to which it is put, and that regard may be had not only to the present use but also to any ordinary uses to which the tenement is adapted, I think it is quite another question whether he is entitled to be protected at the expense of his neighbour in the enjoyment of the light for some special or extraordinary purpose. It is agreed on all hands that a man does not lose or restrict his right to light by non-user of his ancient lights or by not using the full measure of light which the law permits. If that measure be by common law or by the statute the whole amount of light which has had access to his windows, *cadit quæstio*. But if this view of the law be not accepted, you must introduce that "supposed standard" which Lord Justice Romer repudiates. If the actual user is not the test where the use falls below the standard of what may reasonably be required for the ordinary uses of inhabitancy and business, why (it may be asked) should it be made a test where the use has been of a special or extraordinary character in excess of that standard. It does seem to me unreasonable to hold that where a man for his own convenience or profit converts two or more rooms of his house into one without making provision for lighting them, or converts a portion of his house into a photographic studio, or puts it to some similar purpose, he can suddenly call upon his neighbour to leave him a supply of light which is rendered necessary only by such alterations, and thereby impose what is in substance and in truth an increased burden on his neighbour. If the action be brought a month before the change it would be dismissed. If it be brought a month afterwards an injunction would be granted. I am of opinion that the Courts have gone too far in this question of lights, and have imposed undue restrictions on persons in the exercise of their lawful right to build on their own land.

In the second argument before your Lordships the leading counsel for the respondents contended that his clients had for more than twenty years enjoyed the access of light over the appellant's land to their ground floor office in its present condition. I believe that all your Lordships are agreed with Mr. Justice Joyce that there is no proof to support such a contention. The fact relied on was not put in issue at the trial, and the evidence was not directed to it. If the plaintiffs had intended to claim and rely on a special easement of that description, it was for them to state their claim and prove the facts to support it. It is unnecessary to say, therefore, whether such a claim would be good in law. Vice-Chancellor Malins thought it could be sustained if the special user was had with the knowledge of the owner of the previous tenement. I will only say that I see some difficulties in the way, and reserve my opinion.

My Lords, I must apologise for the length at which I have trespassed on your attention. According to both principle and authority, I am of opinion that the owner or occupier of the dominant tenement is entitled to the uninterrupted access through his ancient windows of a quantity of light, the measure of which is what is required for the ordinary purposes of inhabitancy or business of the tenement according to the ordinary notions of mankind, and that the question for what purpose he has thought fit to use that light, or the mode in which he finds it convenient to arrange the internal structure of his tenement, does not affect the question. The actual user will neither increase nor diminish the right. The single question in these cases is still what it was in the days of Lord Hardwicke and Lord Eldon, whether the obstruction complained of is a nuisance. I do not myself think that this rule is difficult of application in practice. In the majority of cases no such questions as those which have been raised in Warren *v.* Brown and the present case occur. The experience of surveyors who are practically conversant with this matter is entitled to great respect. As Mr. Vigers states in his evidence, they have adopted a working rule for the purpose of advising those who consult them and settling differences by negotiation. The rule of 45 degrees is not, of course, a rule of law, and is not applicable to every case. But I agree with Lord Selborne that it may properly be used as *primâ facie* evidence.

For these reasons I think that the appeal should be allowed, and the decree of Mr. Justice Joyce restored with costs here and below.

Lord Robertson concurred in the judgments that had been delivered.

Lord Lindley: My Lords,—Mr. Justice Joyce, who was asked to grant an injunction before the defendant's buildings had been erected, considered that although the buildings would sensibly diminish the plaintiffs' light, the diminution would not materially affect his comfort or convenience, and would not be sufficient to entitle the plaintiffs to any relief, and he dismissed their action. The Court of Appeal, however, took a different view, and granted a mandatory injunction ordering the defendant to pull down part of his building, which had been completed after the injunction had been refused. Hence the appeal to your Lordships.

The language of section 3 of the Prescription, Act 2 and 3 Will. 4, c. 71, shows that in order to acquire a right to light there must be:—

1. Access and use of light, not access alone. Access here is understood to refer to free passage of light over the servient tenement; see per Fry, L.J., in 31 Ch. D. s. 75, and per Kay, J., in 40 Ch. D. 26.

2. Such access and use must be to and for some dwelling-house, workshop, or other building (as to which see Harris *v.* De Pinna, 33 Ch. D. 238).

3. Such access and use must be actually enjoyed therewith.

4. Such enjoyment must be without interruption for twenty years.

5. If all these are proved, the right to the access and use of light so enjoyed becomes absolute and indefeasible, unless it can be explained by some deed or writing.

Pausing here for a moment, it will be observed that the statute does not in terms confer a right to light, but rather assumes its acquisition by use and enjoyment, and declares it to be "absolute and indefeasible."

Again, your Lordships will observe that nothing is said about enjoyment as of right; and notwithstanding section 5 of the Act, which refers to enjoyment as of right, it was early decided that as regards light claimed under section 3 enjoyment as of right need not be alleged or proved; and that the right, whatever it may be, is acquired by twenty years' use and enjoyment without interruption and without written consent. See Truscott *v.* Merchant Taylors Company, 11 Ex., 855, and Frewen *v.* Phillips, 11 C.B., N.S. 449; Simper v. Foley, 2 J. and H. 555, and Harbidge *v.* Warwick, 3 Ex. 557. This was not so under the old law.

As regards use and enjoyment there are some instructive decisions on unfinished and uninhabited houses, and on windows kept closed by shutters. These decisions show that a right to light may be acquired in respect of a house which has stood for twenty years without being occupied or even finished so as to be fit for occupation; and that the fact that shutters have been closed for some months at a time does not prevent the acquisition of a right to light through the windows. See Courtald *v.* Legh, L.R. 4, Ex. 126; Cooper *v.* Straker, 40 Ch. D. 21; Collis *v.* Laugher, 1894, 3 Ch. 659; Smith *v.* Baxter, 1900, 2 Ch. 143.

These decisions did not, however, turn upon or settle with any precision the amount of light to which a right is acquired by twenty years' user. Nor is the statute clear upon this point. At one time it appears to have been considered that in all cases the size and situation of the aperture through which light had come for twenty years formed both the maximum and minimum measures of the right acquired, without reference to the use and enjoyment of the light which had so come. This view was based on some observations made by Lord Westbury in Tapling *v.* Jones, 11 H.L. 305-6, and on Lord Cranworth's judgment in Yates *v.* Jack, 1 Ch. 295, which I will notice presently. Lord Chelmsford took the same view in Calcraft *v.* Thompson, 15 W.R. 387.

But this view was emphatically negatived by the Court of Appeal in Chancery in Kelk *v.* Pearson, 6 Ch. 809; The City of London Brewery Company *v.* Tennant, 9 Ch. 212, and Leech *v.* Seveder, 9 Ch. 463. In Moore *v.* Hall, 3 Q.B.D. 178, however, both Mellor and Manisty, JJ., adopted the interpretation thus repudiated, but it does not appear that this were aware of the repudiation.

Kelk *v.* Pearson shows that in ordinary cases a person does not necessarily acquire a right to all the light he has had for twenty years. He may have had more than he reasonably required either for domestic or business purposes; and in that case his right is limited to the amount of light reasonably required.

There can be no doubt that Lord Cranworth's language in Yates *v.* Jack, and the headnote to it, and the form of injunction granted, have been regarded as authorities for the view that in all cases the statute confers a right to all the light which has come to a window for twenty years; and there are passages in the judgments of Cotton and Bowen, L.JJ., in Scott *v.* Pape, 31 Ch. D. 554, which support the same view. This is to be regretted as it has tended to unsettle the rule laid down in Kelk *v.* Pearson. The decision in Yates *v.* Jack did not, however, really go so far as has been supposed, for the plaintiff's windows were darkened to such an extent as to render the plaintiff's house much less convenient for purposes of business than it was before. The case did not turn on the mere fact that some diminution of light was proved. The plaintiff's right to light was clearly infringed, whether the measure of the light to which he was entitled was all that had come through his windows or only so much as was reasonably necessary for business purposes. If these facts are borne in mind, nothing will be found in the actual decision which conflicts with the views previously expressed by Lord Cranworth in Clark *v.* Clark, 1 Ch. 16, and adopted by the Court of Appeal in the cases already mentioned.

The common form of injunction in these cases is that adopted in Yates *v.* Jack (L.R., 1 Ch. 295) and Dent *v.* Auction Mart Company (L.R., 2 Eq., at p. 255). It is to restrain the defendants from erecting any building so as to obstruct the free access of light to the ancient windows of the plaintiff, as such access was enjoyed previously to the taking down of the house which formerly stood on the site of the defendants' new buildings.

This form is framed upon the supposition that the plaintiff has established his right to the amount of light which he in fact enjoyed before the obstruction complained of. But it by no means follows from the form that everyone is entitled to an injunction who can prove that he has been deprived of some of the light which he in fact had before it was interfered with. He may have had more than he can acquire a right to use and enjoy in future. I am, however, under the impression that this

inference has been drawn and that the form has been regarded as strengthening the view of the law repudiated in Kelk *v.* Pearson.

So to regard the form is, in my opinion, a mistake. The doctrine laid down in Back *v.* Stacey (2 Car. and P. 465), as I understand it, is the same as that laid down, although in somewhat different language, by the Court of Appeal in Kelk *v.* Pearson (6 Ch. 809) and the City of London Brewery Company *v.* Tennant (9 Ch. 212), and must, I think, be taken as finally established and as good, sound law which your Lordships should adopt, notwithstanding the observations in the Irish case of Mackay *v.* Scottish Widows' Company (Ir. Rep. 11 Eq. 541). That doctrine, as stated in the City of London Brewery Company *v.* Tennant, is that, generally speaking, an owner of ancient lights is entitled to sufficient light according to the ordinary notions of mankind for the comfortable use and enjoyment of his house as a dwelling-house, if it is a dwelling-house, or for the beneficial use and occupation of the house if it is a warehouse, a shop, or other place of business (see 9 Ch. 216. 7). The expressions "the ordinary notions of mankind," "comfortable use and enjoyment," and "beneficial use and occupation," introduce elements of uncertainty; but similar uncertainty has always existed and exists still in all cases of nuisance, and in this country an obstruction of light has commonly been regarded as a nuisance, although the right to light has been regarded as a peculiar kind of easement.

If a more absolute standard had been adopted in all cases certainty would, no doubt, have been gained; but the consequences would frequently have been very oppressive on the owner of the servient tenement, and far more so than under the old law. The owner of the servient tenement could have done nothing on his own land which, in fact, diminished the light acquired by his neighbour, even if all of it was not wanted for comfortable enjoyment or business purposes. It would follow that the owner of a piece of vacant land opposite to a house in an ordinary street could not build upon it at all after twenty years. The adherence to the old but uncertain standard of comfort and convenience avoids the danger of oppression and extortion, and renders it necessary to take a wider view of each case, especially when an injunction is asked for.

The decision in Kelk *v.* Pearson has a far-reaching effect. If there is no absolute right to all the light which comes to a given window no action will lie for an obstruction to that light unless the obstruction amounts to a nuisance. If there is no right of action *à fortiori*, there is no right to an injunction to prevent a permanent diminution of light unless it amounts to a nuisance. But in considering what is an actionable nuisance, regard is had not to special circumstances which cause something to be an annoyance to a particular person, but to the habits and requirements of ordinary people, and it is by no means to be taken for granted that a person who wants an extraordinary amount of light for a particular business can maintain an action for a diminution of light if only his special requirements are interfered with. See, as to nuisances to persons carrying on delicate trades or requiring more comfort or freedom from annoyance than ordinary people, Walter *v.* Selfe, 4 De G. and Sm. 322; Crump *v.* Lambert, L.R. 3 Eq. 409; and The Eastern and South African Tel. Company *v.* The Cape Town Tramways Company, 1902, A.C., at p. 393, and as to the character of the neighbourhood, see St. Helens Smelting Company *v.* Tipping, 11 H.L. 642.

The expression "right to light" is sanctioned by the Prescription Act, and is convenient; but its use is apt to lead to error and to forgetfulness of the burden thrown on the servient tenement. This burden, however, ought never to be lost sight of in considering the extent of the right claimed in respect of the dominant tenement.

But the adoption of the more flexible standard of comfort and convenience has introduced difficulties of a serious nature, especially when dealing with places of business, and it is not surprising that different views on this subject should have been taken, and that the decisions upon it should be inconsistent with each other. That they are inconsistent is apparent from the careful review of them by Mr. J. Wright in Warren *v.* Brown, 1900, 2 Q.B. 722.

In applying the rule laid down in Kelk *v.* Pearson it is impossible to avoid considering how much light is left and where it comes from. But the question to be decided is not how much light is left, but whether he has been deprived of so much as to constitute an actionable nuisance. If he has, it is no defence to say that he has as much light left as most other people. See Dent *v.* Auction Mart Company, 2 Eq. 250, 251. Too much weight may have been given by Mr. Justice Wright to the amount of light left in Warren *v.* Brown, 1900, 2 Q.B. 722, and this explains the reversal of his decision by the Court of Appeal.

There is no rule of law that if a person has 45 degrees of unobstructed light through a particular window left to him he cannot maintain an action for a nuisance caused by diminishing the light which formerly came through that window: Theed *v.* Debenham, 2 Ch. D. 165. But experience shows that it is, generally speaking, a fair working rule to consider that no substantial injury is done to him where an angle of 45 degrees is left to him, especially if there is good light from other directions as well. The late Lord Justice Cotton pointed this out in The Ecclesiastical Commissioners v. Kino, 14 C.H. 228; see also Parker *v.* First Avenue Hotel Company, 24 Ch. D. 282.

As regards light from other quarters, such light cannot be disregarded; for, as pointed out by V.C. James in the Dyers' Company *v.* King, 9 Eq. 438, the light from other quarters, and the light, the obstruction of which is complained of, may be so much in excess of what is protected by law as to render the interference complained of non-actionable. I apprehend, however, that light to which a right has not been acquired by grant or prescription, and of which the plaintiff may be deprived at any time, ought not be taken into account. (See the case just cited.)

The purpose for which a person may desire to use a particular room or building in future does not either enlarge or diminish the easement which he has acquired. If he chooses in future to use a well-lighted room or building for a lumber room for which little light is required he does not lose his right to use the same room or building for some other purpose for which more light is required. Aynsley *v.* Glover, 8 Eq. 548, and 10 Ch. 283, is in accordance with this view. But if a room or building has been so built as to be badly lighted, the owner or occupier cannot by enlarging the windows or altering the purpose for which he uses it increase the burden on the servient tenement. Martin *v.* Goble, 1 Camp. 380, where a malthouse was turned into a workhouse, may, I think, be upheld on this principle, and the observations of V.C. Wood on Martin *v.* Goble, in Dent *v.* Auction Mart Company, 2 Eq. 238, support this view. There was, in fact, no substantial interference with the light to which they were entitled.

Coming now to the present case, I am clearly of opinion that no injunction, and certainly no mandatory injunction, ought to have been granted. Mr. J. Joyce was asked for an injunction and he refused it, and, in my opinion, quite rightly. He came to the conclusion that although there would be a sensible diminution of light and some inconvenience to the plaintiffs, yet they had not established by twenty years' user a right to all the light which they had had, and that the obstruction complained of would not amount to an actionable nuisance, and so infringe the plaintiffs' right. The Court of Appeal, taking a different view of the amount of light to which the plaintiffs were entitled, reversed this decision, and ordered a partial demolition of the buildings erected by the defendants. For the reasons already given, I have come to the conclusion that this was wrong.

I should stop here were it not that I feel very strongly that in any view of the case it was one for a mandatory injunction. I am convinced that even if the plaintiffs have a cause of action, the damages which could properly be awarded them would be very small, and to grant a mandatory injunction in such a case as this would be unduly oppressive and not in accordance with the principles on which equitable relief has been usually granted. See the Curriers' Company *v.* Corbet, 2 Dr. and Sm. 355; Robson *v.* Whittingham, 1 Ch. 442; and The National Provincial Place Glass Company, 6 Ch. D. 757, at p. 761, in all of which an injunction was refused, although the plaintiff's legal right had been infringed. In Warren *v.* Brown the Court of Appeal only give damages. The present case is eminently one in which damages would be an adequate remedy, even assuming the plaintiffs could prove a small nuisance for which some damages could be properly given; and where that is the case an injunction, and especially a mandatory injunction, ought not to issue. The doctrine that where a legal right is continuously infringed an injunction to protect it ought to be granted is subject to qualification, as was carefully explained by Sir George Jessel in Aynsley *v.* Glover, 18 Eq. 551, *et seq.*, and more recently by the Court of Appeal in Shelfer *v.* City of London Electric Lighting Company, 1895, 1 Ch., pp. 310, 314-316, and 322.

My Lords, the result of the foregoing review of the authorities is not altogether satisfactory. The general principle deducible from them appears to be that the right to light is, in truth, no more than a right to be protected against a particular form of nuisance, and that an action for obstruction of light which has, in fact, been used and enjoyed for twenty years without interruption or written consent cannot be sustained unless the obstruction amounts to an actionable nuisance, and this often depends upon considerations wider than facts applicable to the complainant himself. There are elements of uncertainty which render it impossible to lay down any definite rule applicable to all cases. First, there is the uncertainty as to what amount of obstruction constitutes an actionable nuisance; and, secondly, there is the uncertainty as to whether the proper remedy is an injunction or damages. But notwithstanding these elements of uncertainty the good sense of judges and juries may be relied upon for adequately protecting rights to light on the one hand and freedom from unnecessary burdens on the other. There must be consideration for both sides in all these controversies. In this case the Court of Appeal have, in my opinion, gone too far, and the appeal ought to be allowed with costs here and below.

[The appeal, as reported in our last issue, was accordingly dismissed with costs.]

WIMBLEDON BUILDING ESTATE DISPUTE.

THE case of the Attorney-General *v.* The Wimbledon House Estate Company, Ltd., came before Mr. Justice Farwell in the Chancery Division on the 5th inst.—an action by the Attorney-General at the relation of the Urban District Council of Wimbledon for a mandatory injunction to restrain defendants from building a house in Parkside-gardens, Wimbledon, contrary to the provisions of the Public Health (Buildings in Streets) Act, 1888.

Mr. Danckwerts, K.C., and Mr. R. J. Parker appeared for the plaintiff, and Mr. W. H. Upjohn, K.C., and Mr. Horne for the defendants.

It appeared that about the middle of 1903 the defendants, who were developing a building estate at Wimbledon, submitted to the Council plans and sections of a house they proposed to erect on the east side of Parkside-gardens, and their contractors commenced work on August 31. The Council's surveyor, on September 8, asked defendants to make certain amendments in the deposited plans so as to comply with the Council's by-laws, and defendants, on September 14, made the required amendments. On September 23, the Council disapproved of the plans, and notice of disapproval was sent the following day, the ground stated being that the plans were not in accordance with the by-laws. It was admitted this was a mistake, but on September 28 the defendants' architects were told by the deputy-surveyor to the Council that the reason for the disapproval of the plans was that the front main wall of the billiard room would project 6 ft. 3 in. beyond the line of the main front wall of the adjoining house, contrary to the provisions of section 3 of the Public Health (Buildings in Streets) Act, 1888. At this time the walls of the billiard room had been erected to a considerable height. The Council, on November 18, gave defendants notice that they were offending against the Act, and that they were liable to a penalty of 40s. for every day during which the offence continued after notice. The Council, on November 23, took out a summons against defendants, and the Justices imposed a penalty of 20*l.* and costs, which were paid. The Attorney-General now alleged that since the conviction the defendants had continued, and threatened to continue, and intended to complete the house contrary to the provisions of the Act, and he claimed a mandatory injunction for the pulling down of so much of the house as infringed the third section of the Act. On behalf of the Attorney-General, it was argued that, as the offence was a continuing offence, the Attorney-General could take action in the interests of the public. On behalf of the defendants it was contended that where there were two remedies both could not be pursued. It was also contended that the Council had been guilty of *laches*, and that, in the circumstances of the case, the court ought not to grant a mandatory order.

In the result, his lordship, in giving judgment, said it was not disputed that the billiard room in question did go beyond the front main wall of the house on the side of it. The defendants appeared to take the point that as they had already been punished by the magistrates they could not now be attacked by the Attorney-General. That, however, was a misapprehension. The penalty was one that could be imposed and imposed again and again from time to time so long as the offence continued. He saw no reason why the Attorney-General should not be heard to say that he would appeal to the Court and make the defendants

pull down the offending structures. The other point taken by the defendants was *laches*, but delay could not be charged as against the Attorney-General. There had been a bold determination by the defendants to go on their own way. He could not say that the Attorney-General ought not to have initiated the litigation, and, therefore, he could not say that he was not right in asking for a mandatory injunction, which he granted accordingly.

A stay of execution for a month was granted with the view to an appeal.

PATENTS OF THE WEEK.

APPLICATIONS PUBLISHED.*

8,963 of 1903.—A. T. SPENCE, J. H. PRUGH, and S. B. ZIMMER: *Machine for Surfacing or Cleaning and Grinding or Polishing Floors of Wood and other materials.*

A floor surfacer or dresser, consisting of surfacing rolls, means for revolving said rolls upon their axes, means for manually adjusting said rolls to engage or clear the floor, and means for moving said rolls forward or back along the floors to be operated upon.

10,078 of 1903.—J. CHALLIS: *Advertisement Glass Tablets.*

An advertisement tablet, consisting of a plate of glass, which is bent or dished, to cause a central part of the plate on which the advertisement is applied to assume a convex or concave oval surface, the back of the said part of the plate being silvered.

12,873 of 1903.—W. J. PECKETT: *Door Knockers.*

This consists in the combination with a door knocker of mechanism whereby a mechanical bell, gong, or the like may be sounded, or an electric circuit completed, for ringing an electric bell, when the knocker is manipulated by knocking at a door.

13,177 of 1903.—SUTCLIFFE, SPEAKMAN, and CO., LTD., and T. DAWBER: *Clay-working Machinery.*

An apparatus for the treatment of clay, consisting in the combination with a mixing mill of a pug mill or chamber provided with a pugging screw, and having an outlet partially closed by a grid or grating, and a revolving knife, secured to the mixer shaft immediately outside the partially-closed outlet.

13,328 of 1903.—G. WHITEHOUSE, LTD., F. H. TUFT, and H. TURNER: *Band Hinges.*

According to this invention, the rear end of the band or strap is formed, as is usual with this class of hinge, with an eye to receive a hinge pin. Each mounting of a pair between which a band or strap is carried is formed with a flat surface to bed against the post and with holes to receive screws, by which it is fixed thereto, and with an outward projection or lug, from which projects a stud or pin, which is formed in one piece of metal with the rest of the mounting. The studs or pins of a pair of these mountings together form the hinge pin upon which the band turns, one of them passing upwards within the eye and the other downwards, and the two preferably just about meeting together at the middle of the eye. It will be seen, however, that mountings of one size may be used for hinges having bands of varying widths, as it is not essential that the studs or pins of the mountings shall meet at the middle of an eye.

14,554 of 1903.—H. TERRISSE: *Treatment of Gums and Resins, and the Preparation of Varnishes.*

A method of dissolving hard and semi-hard resins in siccative oils, consisting in first dissolving the resin in phenol, or a mixture of phenol and cresol, at a temperature between 250 degrees and 290 degrees C., then adding to the solution linseed oil and eliminating the phenol by distillation.

15,347 of 1903.—J. PLACE and SONS, LTD., and W. H. PLACE: *Waste Water-closets, and the like.*

This invention consists in an improved basin for waste water-closets, and the like. According to the improvements, the outlet from the basin is placed at the extreme back thereof, that is to say, the rear wall of the basin drops perpendicularly to the bottom of the outlet, of which it forms the back. By this means a very efficient flush is obtained, as the rush of water from the tipper, after impinging against the back of the basin, drops straight down the outlet, and consequently falls with more momentum than when its course is more or less circuitous. To prevent any soiling of the basin in front of the outlet, a channel is provided in the basin, in that position, for holding the water.

28,778 of 1903.—O. M. EDWARDS: *Windows.*

A window, consisting in the combination of a guide way, a sash, adapted to move in the guide way, a holding device, pivotally mounted on the window frame adjacent to the guide way, and to bear upon one portion of the sash, and also to engage with the movable part of another device, a second holding device mounted upon the sash, and provided with a movable part, adapted to engage with a portion of the pivotally-mounted device, and to bring pressure against the sash, and at the same time cause both devices to increase their holding action upon the sash at different points thereon, as such movable part is moved in one direction.

3,250 of 1904.—F. SCHUMANN: *Slide Ways for Saving Persons and Goods from the Upper Stories of Burning Buildings.*

Slide ways for saving persons and goods from the stories of burning buildings, the distinguishing feature being the arrangement of telescoping sections of U-shaped cross-section on a carriage, to the first of which sections a rope for drawing up the slide way is fixed on a raised ladder in connexion therewith, the different sections, as they are drawn out from one another, are firmly joined together by the snapping of a spring-bolt in the groove of each part, and a firm slide way is thus formed on the ladder.

3,594 of 1904.—J. H. KIRK: *Enamelled Metal Tablets or Plates for Facing Walls, Ceilings, and the like.*

In carrying out this invention, metal blanks of square, oblong, rhombic, rhomboidal, or other suitable shape are provided according to the pattern to be produced by the tablets, and two or more of the edges of each tablet are bent so as to form semi-circular flanges, which, when the tiles are placed upon a bed of mortar, cement, or other fixing material, form keys to prevent the tablets from becoming detached.

4,276 of 1904.—J. M. TOUTEL: *Cowls and Ventilators.*

A cowl or ventilator, consisting of a pipe, tapering to a less diameter at its upper end, said pipe having a spherical or other suitably-shaped body surrounding the higher end of the pipe, and being provided with openings having upward sloping plates for directing the air blowing against them in an upward direction, a hole in the upper part of the sphere permitting the smoke and air to pass out, said opening having a suitable cap or cover mounted above it.

4,392 of 1904.—F. FOUCHE: *Apparatus for Heating and Cooling.*

An apparatus for heating and cooling, consisting in the method of assembling corrugated or non-corrugated hollow plates in straight lines, coiled or sinuous paths, in parallel or in series, so as to cover surfaces of large extent.

5,985 of 1904.—K. N. FRYDENLUND: *Method of Manufacturing Tiles or other Glazed Articles from Slate or Slate Refuse.*

A method of preparing plates, tiles, or the like from slate or slate residue, consisting in moistening the pulverised slate with a liquid prepared by warming together with sodium hydrate, colophony, and water, and subsequently adding a dilute sodium silicate solution thereto, in subjecting the mass to a comparatively small pressure to mould the same into plates or tiles, and in drying the pressed articles first at ordinary temperature, then at a temperature of from 60 degrees to 100 degrees C.

6,007 of 1904.—V. STEGER: *Manufacture of Artificial Stone, Blocks, or Bricks.*

A method of making artificial bricks, which consists in mixing ninety-three parts of sand and seven parts of lime, then adding a solution of carbonate of soda and water in proportion of eight pounds of the soda to 100 gallons of water, then forming the mixture into bricks or the like, then subjecting the article to the action of steam for ten hours, more or less, the steam being previously brought into contact with a mixture of caustic potash and flower of sulphur.

17,627 of 1903.—S. VIGERS: *Detachable or Removable Parquetry.*

This relates to detachable or removable parquetry, composed of a large number of small pieces, having the grain reversed, the pieces being glued or fastened together upon thin sheets on a backing of cloth, canvas, veneer, and finished and polished ready for laying.

10,702 of 1903.—R. D. LAMPSON: *Electric Advertising Devices and Street Indicators.*

A device, comprising a casing provided with a sight opening, rollers mounted in said casing above and below such opening, a strip secured at the ends to said rollers, and provided with a perforated metal backing, and on its outer surface with objects to be displayed, a shaft carrying toothed wheels engaging said perforations, and a motor geared to said shaft for intermittently rotating said toothed wheels to bring such objects successively before the sight opening.

20,971 of 1903.—W. H. BAXTER: *Machinery or Apparatus for Elevating, Screening, and Loading Broken or Crushed Stone, Ore Refuse Clinker, and the like, or other Materials.*

The construction of elevating and screening mechanism upon a system by which the material under treatment is raised by an elevator driven from the top and divided into sections, the division being so arranged as to permit the removal of rejected material at an early stage in the operation of the machine, thereby minimising the power required to drive the machine and the wear and tear incidental to working it.

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

April 25.—By WILKINSON, SON, & WELCH (at Brighton).

Brighton, Sussex.—18, Bedford-sq., f., y.r. 70*l.*	£850
5, West Hill-st., f., w.r. 32*l.* 10s.	415
14, Hampton-pl., f., y.r. 50*l.*	700
Hampton-st., freehold stabling, y.r. 10*l.*	150
5, Hampton-st. (workshops, stores, and yard), f., y.r. 30*l.*	305

April 28.—By STEVENSON & ALEXANDER (at Cardiff).

Ely, Glamorgan.—Ely Moors, two closes of pasture land, 6 a. 3 r. 18 p., f.	1,490

April 29.—By W. DEW & SON (at Conway).

Caerhun, etc., Carnarvon.—"The Gorswen Estate," 592 a. 3 r. 32 p. (in nine lots)	12,191

May 2.—By DEBENHAM, TEWSON, & CO.

Whitechapel.—Duncan-st., f.g.r. 240*l.*, reversion in 71 yrs.	4,800
2, Commercial-st. (s.), f., y.r. 65*l.*	1,400
Hackney.—Well-st., f.g.r. 49*l.*, reversion in 53 yrs.	1,270
159, 161, 163, and 165, Well-st. (s.), f., y.r. 181*l.*	2,695

By KEMSLEYS'.

Homerton.—57 to 67 (odd), Berger-rd., f., w.r. 135*l.* 4s.	1,350
Barnsbury.—Bride-st. ("White Swan" b.h., etc.), f.g.r. 9*l.* 9s., reversion in 11½ yrs.	1,270
Hornsey.—Westfield-rd., f.g.r. 6*l.*, reversion in 63½ yrs.	150
Islington.—62 and 70, Oxford-rd., u.t. 48½ yrs., g.r. 16*l.*, y.r. 82*l.*	735
East Ham.—1 to 20, Fabian-st., f., w.r. 276*l.* 18s.	1,810

By J. W. NEIGHBOUR.

City-road.—5, Coomb-st., u.t. 20 yrs., g.r. 5*l.* 10s., e.r. 36*l.*	190

By JAMES HARRIS & SON (at Fareham).

Hambledon, Hants.—"Apless Farm," 36 a. 3 r. 7 p., f.	1,450
Three freehold pastures, 10 a. 3 r. 26 p.	370

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; gr. for grove; b.h. for beer-house; p.h. for public-house; o. for offices; s. for shops; ct. for court.

MEETINGS.

FRIDAY, MAY 13.

Architectural Association.—Members' Dinner, Criterion Restaurant, Piccadilly Circus. 7 p.m.

Royal Institution.—Mr. M. H. Spielmann, F.S.A., on "The Queen Victoria Memorial." 9 p.m.

SATURDAY, MAY 14.

Architectural Association.—First Summer Visit—to Moor Park, Rickmansworth.

Incorporated Association of Municipal and County Engineers.—Yorkshire District Meeting, York.

British Institute of Certified Carpenters.—Visit to St. Paul's. 2.45 p.m.

St. Paul's Ecclesiological Society.—Visit to Lambeth Palace, under the guidance of Mr. S. W. Kershaw, F.S.A.

Institute of Sanitary Engineers, Ltd.—Visit to Messrs. John I. Thornycroft & Co.'s Works, Chiswick. Members to assemble at the Old Chiswick Church, The Mall, at 10.45 a.m. In the afternoon the members will visit the power station, London Tramways Depôt, Chiswick, and will assemble at the main entrance at 2.30 p.m.

London Topographical Society (Hall of Staple Inn, Holborn).—Mr. T. Cato Worsfold on "The Fayrest Innes of Chancerie." 3.15 p.m.

MONDAY, MAY 16.

Royal Institute of British Architects.—The Rev. J. B. Lock, M.A., on "The Planning of Collegiate Buildings." 8 p.m.

Surveyors' Institution.—Discussion on the paper read by Mr. Thomas Blashill at the meeting of April 18, entitled "London Streets and Street Traffic." 8 p.m.

TUESDAY, MAY 17.

Royal Institution.—Mr. L. Fletcher, M.A., F.R.S., on "Meteorites," III. 5 p.m.

Society of Arts (Applied Art Section).—Mr. Lasenby Liberty on "Pewter and the Revival of its Use." 8 p.m.

Royal Victoria Hall, Waterloo-road, S.E.—Mr. H. Birdwood on "Iron and Steel under the Microscope."

Edinburgh Architectural Association (Associates' Section).—Visit to Melrose and Darnick Tower.

WEDNESDAY, MAY 18.

British Archæological Association.—(1) Paper by Mr. C. H. Compton, entitled "Can Votive Offerings be Treasure Trove?"; (2) Mr. R. H. Forster, M.A., on "Durham and the Rights of Sanctuary." 8 p.m.

Builders' Foremen and Clerks of Works' Institution.—Ordinary Meeting of the members. 8 p.m.

Institute of Sanitary Engineers, Ltd.—Election Committee, 3.0 p.m. General Purposes and Finance Committee, 5.0. Council Meeting, 7.0.

THURSDAY, MAY 19.

Institution of Electrical Engineers (at the Society of Arts).—Discussion on Messrs. Parsons, Stoney, and Martin's paper, entitled "The Steam Turbine as Applied to Electrical Engineering." 8 p.m.

FRIDAY, MAY 20.

Royal Institution.—Professor E. Rutherford, M.A., on "The Radiation and Emanation of Radium." 9 p.m.

Junior Institution of Engineers (Westminster Palace Hotel).—Paper entitled "Practical Notes on the Running of Motor Cars and Cycles," by Lieut. W. G. Windham, R.N. 8 p.m.

Incorporated Association of Municipal and County Engineers.—Midland District Meeting, Buxton.

SATURDAY, MAY 21.

Edinburgh Architectural Association.—Visit to Fordell Castle and Old Garden.

Incorporated Association of Municipal and County Engineers.—Midland District Meeting. Concluded.

TO CORRESPONDENTS.

D. & M. (Amount should have been stated). E. W. (Names and amounts should have been stated).

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PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and Quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£	s.	d.			
Hard Stocks	1	16	0	per 1000	alongside, in river.	
Rough Stocks and Grizzles	1	13	0	"	"	"
Facing Stocks	2	12	0	"	"	"
Shippers	2	10	0	"	"	"
Flettons	1	10	0	"	at railway depôt.	
Red Wire Cuts	1	13	0	"	"	"
Best Fareham Red	3	12	0	"	"	"
Best Red Pressed Ruabon Facing	5	0	0	"	"	"
Best Blue Pressed Staffordshire	4	4	0	"	"	"
Do. Bullnose	4	10	0	"	"	"
Best Stourbridge Fire Bricks	4	8	0	"	"	"
GLAZED BRICKS.						
Best White and Ivory Glazed Stretchers	13	0	0			
Headers	12	0	0	"	"	"
Quoins, Bullnose, and Flats	17	0	0			
Double Stretchers	19	0	0	"	"	"
Double Headers	16	0	0	"	"	"
One Side and two Ends	19	0	0	"	"	"
Two Sides and one End	20	0	0	"	"	"
Splays, Chamferred, Squints	20	0	0	"	"	"
Best Dipped Salt Glazed Stretchers, and Header	12	0	0	"	"	"
Quoins, Bullnose, and Flats	14	0	0			
Double Stretchers	15	0	0	"	"	"
Double Headers	14	0	0	"	"	"
One Side and two Ends	15	0	0	"	"	"

BRICKS, &c.—(*Continued*).

	£	s.	d.			
Two Sides and one End	15	0	0	per 1000	at railway depot.	
Splays, Chamferred, Squints	14	0	0	"	"	
Second Quality, White and Dipped Salt Glazed	2	0	0	"	less than best.	

	s.	d.		
Thames and Pit Sand	7	3	per yard,	delivered.
Thames Ballast	6	0	"	"
Best Portland Cement	30	0	per ton,	"
Best Ground Blue Lias Lime	21	0	"	"

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime.....12s. 0d. per yard, delivered.
Stourbridge Fireclay in sacks 27s. 6d. per ton at rly. dpt.

STONE.

	s.	d.		
BATH STONE—delivered on road waggons, Paddington Depôt	1	6½	per ft. cube.	
Do. do. delivered on road waggons, Nine Elms Depôt	1	8½	"	"
PORTLAND STONE (20 ft. average)—				
Brown Whitbed, delivered on road waggons, Paddington depôt, Nine Elms depôt, or Pimlico Wharf	2	1	"	"
White Basebed, delivered on road waggons, Paddington depôt, Nine Elms depôt, or Pimlico Wharf	2	2½	"	"

	s.	d.		
Ancester in blocks	1	11	per ft. cube,	deld. rly. depôt.
Beer "	1	6	"	"
Greenshill "	1	10	"	"
Darley Dale in blocks	2	4	"	"
Red Corsehill "	2	5	"	"
Closeburn Red Freestone	2	0	"	"
Red Mansfield "	2	4	"	"

YORK STONE—*Robin Hood Quality*

	s.	d.		
Scappled random blocks	2	10	per ft. cube.	"
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2	3	per foot super.	"
6 in. rubbed two sides ditto, ditto	2	6	"	"
3 in. sawn two sides slabs (random sizes)	0	11½	"	"
2 in. to 2½ in. sawn one side slabs (random sizes)	0	7½	"	"
1½ in. to 2 in. ditto, ditto	0	6	"	"
HARD YORK—				
Scappled random blocks	3	0	per ft. cube,	"
6 in. sawn two sides, landings to sizes (under 40 ft. super.)	2	8	per ft. super.	"
6 in. rubbed two sides Ditto	3	0	"	"
3 in. sawn two sides (slabs random sizes)	1	2	"	"
2 in. self-faced random flags	0	5	"	"
Hopton Wood (Hard Bed) in blocks	2	3	per ft. cube.	
" " " 6 in. sawn both sides landings	2	7	per ft. super. deld. rly. depôt	
" " " 3 in. do.	1	2½	"	"

SLATES.

in.	in.	£	s.	d.		
20 × 10	best blue Bangor	13	2	6	per 1000 of 1200	at r. d.
20 × 12	" "	13	17	6	"	"
20 × 10	first quality "	13	0	0	"	"
20 × 12	" " "	13	15	0	"	"
16 × 8	" " "	7	5	0	"	"
20 × 10	best blue Portmadoc	12	12	6	"	"
16 × 8	best blue Portmadoc	6	12	6	"	"
20 × 10	best Eureka unfading green	15	17	6	"	"
20 × 12	" "	18	7	6	"	"
18 × 10	" "	13	5	0	"	"
16 × 8	" "	10	5	0	"	"
20 × 10	permanent green	11	12	6	"	"
18 × 10	" "	9	12	6	"	"
16 × 8	" "	6	12	6	"	"

TILES.

	s.	d.		
Best plain red roofing tiles	42	0	per 1000 at rly. depôt.	
Hip and Valley tiles	3	7	per doz.	
Best Brosely tiles	50	0	per 1000	" "
Do. Ornamental tiles	52	6	"	" "
Hip and Valley tiles	4	0	per doz.	" "
Best Ruabon red, brown, or brindled do. (Edwards)	57	6	per 1000	" "
Do. Ornamental do	60	0	"	" "
Hip tiles	4	0	per doz.	" "
Valley tiles	3	0	"	" "
Best Red or Mottled Staffordshire do. (Peakes)	51	9	per 1000	" "
Do. Ornamental do	54	6	"	" "
Hip tiles	4	1	per doz.	" "
Valley tiles	3	8	"	" "
Best "Rosemary" brand plain tiles	48	0	per 1000	" "
Best Ornamental tiles	50	0	"	" "
Hip tiles	4	0	per doz.	" "
Valley tiles	3	8	"	" "
Best "Hartshill" brand plain tiles, sand faced.	50	0	per 1000	" "
Do. pressed	47	6	"	" "
Do. Ornamental do	50	0	"	" "
Hip tiles	4	0	per doz.	" "
Valley tiles	3	6	"	" "

WOOD.

	At per standard. £	s.	d.	£	s.	d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in	15	10	0	16	10	0
Deals: best 3 by 4	14	10	0	15	10	0
Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.	11	10	0	12	10	0
Battens: best 2½ by 6 and 3 by 6	0	10	0	less than 7 in. and 8 in.		

WOOD.—(*Continued*).

	At per standard. £	s.	d.	£	s.	d.
Deals: seconds	1	0	0	less than best		
Battens: seconds	0	10	0	"	"	"
2 in. by 4 in. and 2 in. by 6 in.	9	0	0	"	"	"
2 in. by 4½ in. and 2 in. by 5 in.	8	10	0	9	10	0
Foreign Sawn Boards—						
1 in. and 1¼ in. by 7 in.	0	10	0	more than battens.		
¾ in.	1	0	0	"		

	At per load of 50 ft. £	s.	d.	£	s.	d.
Fir timber: best middling Danzig or Memel (average specification)	4	10	0	5	0	0
Seconds	4	5	0	4	10	0
Small timber (8 in. to 10 in.)	3	12	6	3	15	0
Small timber (6 in. to 8 in.)	3	0	0	3	10	0
Swedish balks	2	15	0	3	0	0
Pitch-pine timber (30 ft. average)	3	5	0	3	15	0

JOINERS' WOOD.

White Sea:	At per standard.					
first yellow deals, 3 in. by 11 in	23	0	0	24	0	0
3 in. by 9 in.	21	0	0	22	10	0
Battens, 2½ in. and 3 in. by 7 in.	17	0	0	18	10	0
Second yellow deals, 3 in. by 11 in.	18	10	0	20	0	0
" " 3 in. by 9 in.	17	10	0	19	0	0
Battens, 2½ in. and 3 in. by 7 in.	13	10	0	14	10	0
Third yellow deals, 3 in. by 11 in. and 9 in.	15	10	0	16	10	0
Battens, 2½ in. and 3 in. by 7 in.	11	10	0	12	10	0
Petersburg: first yellow deals, 3 in. by 11 in.	21	0	0	22	10	0
Do. 3 in. by 9 in.	18	0	0	19	10	0
Battens	13	10	0	15	0	0
Petersburg: second yellow deals, 3 in. by 11 in.	16	0	0	17	0	0
Do. 3 in. by 9 in.	14	10	0	16	0	0
Battens	11	0	0	12	10	0
Third yellow deals, 3 in. by 11 in.	13	10	0	14	0	0
Do. 3 in. by 9 in.	13	0	0	14	0	0
Battens	10	0	0	11	0	0
White Sea and Petersburg: —						
First white deals, 3 in. by 11 in.	14	10	0	15	10	0
" " 3 in. by 9 in.	13	10	0	14	10	0
Battens	11	0	0	12	0	0
Second white deals, 3 in. by 11 in.	13	10	0	14	10	0
" " 3 in. by 9 in.	12	10	0	13	10	0
" " battens	9	10	0	10	10	0
Pitch-pine: deals	16	10	0	20	0	0
Under 2 in. thick extra	0	10	0	1	0	0
Yellow Pine—First, regular sizes	35	0	0	upwards.		
Oddments	24	0	0	26	0	0
Seconds, regular sizes	26	10	0	28	10	0
Yellow Pine oddments	22	0	0	24	0	0
Kauri Pine—Planks, per ft. cube	0	3	6	0	5	0
Danzig and Stettin Oak Logs—						
Large, per ft. cube	0	2	6	0	3	6
Small " "	0	2	3	0	2	6
Wainscot Oak Logs, per ft. cube	0	5	0	0	5	6
Dry Wainscot Oak, per ft. sup. as inch	0	0	7	0	0	8
¾ in. do. do.	0	0	6½	—		
Dry Mahogany—Honduras, Tabasco, per ft. super. as inch	0	0	9	0	0	11
Selected, Figury, per ft. sup. as inch	0	1	6	0	2	0
Dry Walnut, American, per ft. sup. as inch	0	0	10	0	1	0
Teak, per load	17	0	0	21	0	0
American Whitewood Planks— per ft. cube	0	4	0	—		

Prepared Flooring—	Per square.					
1 in. by 7 in. yellow, planed and shot	0	13	6	0	17	6
1 in. by 7 in. yellow, planed and matched	0	14	0	0	18	0
1¼ in. by 7 in. yellow, planed and matched	0	16	0	1	0	0
1 in. by 7 in. white, planed and shot	0	12	0	0	14	6
1 in. by 7 in. white, planed and matched	0	12	6	0	15	0
1¼ in. by 7 in. white, planed and matched	0	15	0	0	16	6
¾ in. by 7 in. yellow, matched and beaded or V-jointed brds.	0	11	0	0	13	6
¾ in. by 7 in. do. do. do.	0	14	0	0	18	0
1 in. by 7 in. white do. do.	0	10	0	0	11	6
in. by 7 in. do. do. do.	0	11	6	0	13	6

6 in. at 6d. to 9d. per square less than 7 in.

JOISTS, GIRDERS, &c.

	In London, £	s.	d.	Railway Vans, per ton. £	s.	d.
Rolled Steel Joists, ordinary sections	6	5	0	7	5	0
Compound Girders, ordinary sections	8	2	6	9	5	0
Angles, Tees and Channels, ordinary sections	7	17	6	8	17	6
Flitch Plates	8	5	0	8	15	0
Cast Iron Columns and Stanchions including ordinary patterns	7	2	6	8	5	6

METALS.

	Per ton, in London. £	s.	d.	£	s.	d.
IRON—						
Common Bars	7	5	0	7	15	0
Staffordshire Crown Bars, good merchant quality	7	15	0	8	5	0
Staffordshire "Marked Bars"	10	0	0	—		
Mild Steel Bars	8	15	0	9	5	0
Hoop Iron, basis price	9	5	0	9	10	0
" " Galvanized	17	10	0	—		

(*And upwards, according to size and gauge.)

Sheet Iron (Black)—						
Ordinary sizes to 20 g.	9	15	0			—
" " 24 g.	10	15	0			—
" " 26 g.	12	5	0			—
Sheet Iron, Galvanised, flat, ordinary quality—						
Ordinary sizes—6 ft. by 2 ft. to 3 ft. to 20 g.	12	15	0			—
Ordinary sizes to 22 g. and 24 g.	13	5	0			—
" " 26 g.	14	5	0			—
Sheet Iron, Galvanised, flat, best quality—						
Ordinary sizes to 20 g.	16	0	0			—
" " 22 g. and 24 g.	16	10	0			—
" " 26 g.	18	0	0			—
Galvanised Corrugated Sheets—						
Ordinary sizes 6 ft. to 8 ft. 20 g.	12	10	0			—
" " 22 g. and 24 g.	13	0	0			—
" " 26 g.	13	15	0			—

METALS—*Continued.*

	Per ton, in London. £ s. d.		£ s. d.
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 26 g. and thicker	11 15 0	...	—
Best Soft Steel Sheets, 22 g. & 24 g.	12 15 0	...	—
,, ,, 26 g.	14 0 0	...	—
Cut nails, 3 in. to 6 in.	9 0 0	...	9 10 0

(Under 3 in., usual trade extras.)

LEAD, &c.

	Per ton, in London. £ s. d.		£ s. d.
LEAD—Sheet, English, 3lb. and up	14 12 6	...	—
Pipe in coils	15 2 6	...	—
Soil pipe	17 12 6	...	—
Compo pipe	17 12 6	...	—
ZINC—Sheet—			
Vieille Montagne ....ton	27 5 0	...	—
Silesian	27 0 0	...	—
COPPER—			
Strong Sheet....per lb.	0 0 10½	...	—
Thin ,, ,,	0 0 11½	...	—
Copper nails ,,	0 0 11	...	—
BRASS—			
Strong Sheet ,,	0 0 10	...	—
Thin ,, ,,	0 0 11	...	—
TIN—English Ingots ,,	0 1 4	...	—
SOLDER—Plumbers' ,,	0 0 6½	...	—
Tinmen's ,,	0 0 8	...	—
Blowpipe ,,	0 0 9	...	—

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2d. per ft. delivered.
,, fourths	1½d. ,, ,,
21 oz. thirds	3d. ,, ,,
,, fourths	2½d. ,, ,,
26 oz. thirds	3½d. ,, ,,
,, fourths	3d. ,, ,,
32 oz. thirds	4½d. ,, ,,
,, fourths	4d. ,, ,,
Fluted Sheet, 15 oz.	2½d. ,, ,,
,, 21 oz.	3½d. ,, ,,
¼ Hartley's Rolled Plate	1½d. ,, ,,
⅜ ,, ,, ,,	1⅝d. ,, ,,
½ ,, ,, ,,	2½d. ,, ,,

OILS, &c.

		£ s. d.
Raw Linseed Oil in pipes or barrels	per gallon	0 1 5
,, ,, ,, in drums	,,	0 1 8
Boiled ,, ,, in pipes or barrels	,,	0 1 8
,, ,, ,, in drums	,,	0 1 11
Turpentine, in barrels	,,	0 3 7
,, in drums	,,	0 3 9
Genuine Ground English White Lead	per ton	19 0 0
Red Lead, Dry	,,	19 0 0
Best Linseed Oil Putty	per cwt.	0 6 6
Stockholm Tar	per barrel	1 12 0

VARNISHES, &c.

	Per gallon. £ s. d.
Fine Pale Oak Varnish	0 8 0
Pale Copal Oak	0 10 6
Superfine Pale Elastic Oak	0 12 6
Fine Extra Hard Church Oak	0 10 0
Superfine Hard-drying Oak, for seats of Churches	0 14 0
Fine Elastic Carriage	0 12 6
Superfine Pale Elastic Carriage	0 16 0
Fine Pale Maple	0 16 0
Finest Pale Durable Copal	0 18 0
Extra Pale French Oil	1 1 0
Eggshell Flatting Varnish	0 18 0
White Copal Enamel	1 4 0
Extra Pale Paper	0 12 0
Best Japan Gold Size	0 10 6
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 8 6
Berlin Black	0 16 0
Knotting	0 10 0
French and Brush Polish	0 10 0

TERMS OF SUBSCRIPTION.

"THE BUILDER" (Published Weekly) is supplied DIRECT from the Office to residents in any part of the United Kingdom at the rate of 19s. per annum (52 numbers) PREPAID. To all parts of Europe, America, Australia, New Zealand, India, China, Ceylon, &c., 26s. per annum. Remittances (payable to J. MORGAN) should be addressed to the Publisher of "THE BUILDER," Catherine-street, W.C.

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TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays.* [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

BARNARD CASTLE.—For erecting a villa residence, Park-terrace, for Mr. F. W. Raper. Mr. F. Farrow, architect, 7, Market-place, Barnard Castle. Quantities by architect:—

Bricklayer and Mason: J. Kyle & Sons, Barnard Castle*	Total accepted Tenders about £1,000.
Carpenter and Joiner: T. Borrowdale & Son, Barnard Castle*	
Plumber and Glazier: C. E. Raine, Barnard Castle*	
Painter: J. W. Jackson, Barnard Castle*	
C. W. Stockdale, Barnard Castle	
R. Wilson, Barnard Castle	
Plasterer: F. Welford, Barnard Castle*	
R. Brotherton, Barnard Castle	
Slater: J. Lancaster, Barnard Castle*	
C. Martin, York	
G. P. Robinson, Lartington, Barnard Castle	
E. Thompson, Bishop Auckland	
J. & R. Mascall, Bishop Auckland	

BECCLES.—For the erection of a water tower, Ringfield Pumping Station, for the Directors of the Waterworks Company. Mr. Ernest A. Brine, engineer:—

Hipperson Bros.	£239 0 0	C. C. Betts	£194 0 0
J. E. Pestell	220 0 0	H. A. King, Beccles*	181 15 0
Youngs & Son	195 0 0		

BEXHILL (Sussex).—For 1,250 tons of quartzite macadam, for the Corporation. Mr. G. Ball, Borough Surveyor:—

	At per ton.
C. G. German, Portsmouth	£0 12 6
Road Maintenance & Supply Co., Gravesend*	0 12 6
Quartzite Co.	0 11 7

BEXHILL.—For constructing an 18-in. pipe intercepting sewer in Dorset-road, for the Corporation. Mr. G. Ball, Borough Surveyor, Town Hall:—

M. Hookham	£2,739 0 0	J. Jackson	£1,571 17 11
J. Kine	2,178 5 6	S. Carey	1,565 0 0
A. C. Soan	1,972 8 0	Peerless, Dennis, & Co., Eastbourne*	1,187 0 0
F. Adams	1,781 0 0		
G. C. Rayner	1,631 8 0		
G. Shoesmith	1,577 17 10		

[Surveyor's estimate, £1,000.]

BROMLEY.—For additions and decorations, "Rothesay," Plaistow-lane, Bromley, Kent. Messrs. G. Baines & Sons, architects, 5, Clement's-inn, Strand, W.C.:—

T. Crossley & Son	£309 10 0
T. D. Graty, Bromley*	262 0 0

COWES (Isle of Wight).—For the erection of a stable as a wing to Old Charlton, Baring-road, West Cowes, for Miss Sophia Groves. Mr. Philip Sturdy, architect, Bournemouth:—

Jenkins & Sons	£623	J. Nichol, Southampton†	£520
H. E. Day	525		

CROSS KEYS (Mon.).—For erecting nineteen houses, for the Cross Keys Progressive Building Club. Mr. R. L. Roberts, architect, Abercarn:—

J. Williams	£285 0	J. Pritchard, Pontymister, Mon.*	£198 10
J. Charles	245 0		
Thomas & Lyons	210 0	W. & D. Thomas	193 0
E. C. Jordan	209 0		
Davies Bros.	208 0		

DALSTON (Cumberland).—For the erection of a stone bridge, etc., at Powbeck, Dalston, for Carlisle Rural District Council. Mr. J. Graham, engineer, Bank-chambers, Bank-street, Carlisle:—

R. Little	£507 0 0	N. Harrison	£404 15 0
F. Millwood & Co.	410 10 0	R. G. Wilson, Dalston, Cumberland*	403 0 0
J. Laing & Son	405 14 0		

DESBOROUGH (Northants).—For constructing about 800 yds. of railway to join the Midland Railway, for the Co-operative Society. Mr. D. J. Diver, engineer, Desborough. Quantities by engineer:—

Dixon	£5,182	Johnson & Langley	£3,800
Drabble	4,662	C. Chamberlain	3,790
Eastwood	4,660	Dixon	3,526
Johnson & Son	4,480	T. Panter	2,995
Orton	4,319	Siddons & Freeman	2,875
F. Barlow	4,095	W. Brown	2,855
Coker	4,008	E. Heycock & Sons, Gt. Glen*	2,648
Harris	3,950		
Smith & Bunning	3,889		

HARROGATE.—For street improvement work Harlow Moor-road, South Drive, part of Langcliffe-avenue, etc., for the Corporation. Mr. F. Bagshaw, Borough Engineer and Surveyor, Municipal Offices, Harrogate:—

Harlow Moor-road.

B. Oxley, Wetherby-lane, Harrogate*	£1,551 1 5

South Drive.

E. Long, 5, Albert-terrace, Starbeck*	1,261 16 6

Portion of Longcliffe Avenue.

B. Oxley, Wetherby-lane, Harrogate*	453 15 1

Portion of Tewit Well Road.

B. Oxley, Wetherby-lane, Harrogate*	1,234 1 2

HEREFORD.—For erecting a residence at Adam's-hill, Breinton-road, for Mr. E. F. Bulmer. Messrs. Groome & Bettington, architects, Palace-chambers, Hereford. Quantities by the architects:—

C. Cooke	£2,778 5	A. J. Colborne	£2,678 12
Beavan & Hodges	2,770 0	W. Bowers & Co.	2,481 2
W. P. Lewis & Co.	2,769 10	W. Powell, Hereford*	2,394 0

[Exclusive of sanitary fittings, glazing and casements, and heating.]

HOUNSLOW.—For erecting stores, stables, and foreman's cottage on the Pear Tree Estate, for the Heston and Isleworth Urban District Council. Mr. P. G. Parkman, Engineer and Surveyor to the Council, Town Hall, Hounslow. Quantities by Engineer:—

C. Gray, Shepherd's Bush*	£4,330 1 0

IPSWICH.—For house, shop, and printing works, St. Peter's-street, for Mr. T. G. Garrod. Mr. J. A. Scheuermann, architect, 23, High-street, Ipswich. Quantities by Mr. J. S. Parmenter, Ipswich:—

W. Grayston	£1,613	R. Girling	£1,485
V. A. Marriott	1,595	W. H. Death	1,475
G. Kenney	1,563	Scales & Robins	1,469
C. Green	1,510	A. Sadler	1,420
M. Death	1,494	G. Grimwood & Sons, Ipswich*	1,333
H. J. Winzell	1,487		
S. Kenney	1,485		

KIDDERMINSTER.—For additional water supply (Contract No. 2):—

Biggs, Wall, & Co.	£4,500 16 5
C. Jordan & Co.	3,885 0 0
H. Roberts	3,713 0 0
R. W. Fitzmaurice & Co.	3,706 19 0
C. Chamberlain	3,544 0 0
J. W. Dean, Ltd.	3,525 0 0
Davies, Ball, & Co.	3,515 0 0
T. Vale & Son	3,450 0 0
G. Law, Kidderminster*	3,123 13 0

KINGLASSIE.—For extension to cemetery, including mortuary, tool house, etc., for the Parish Council. Mr. W. Birrell, architect, 200, High-street, Kirkcaldy. Quantities by architect:—

A. Wilson	£879 0 0	W. Henderson & Son	£680 5 0
A. Fraser, jun.	849 0 0	W. Page & Son, Thornton*	654 9 9
J. Miller & Sons	820 0 0		
W. Brown	820 0 0		
R. & J. McKee	808 8 3		

HANWELL.—For road works (Shakespeare-road, Cumberland-road, etc.), for the Urban District Council. Mr. S. W. Barnes, A.M.Inst.C.E., Surveyor, Council Offices, Hanwell, W.:—

—	Shakespeare Road. £ s. d.	Southfield Cotts. £ s. d.	Cumberland Road (1st part). £ s. d.	Cumberland Road (2nd part). £ s. d.	Bostonthorpe Road. £ s. d.
F. Fowles	2,087 8 9	438 17 9	1,632 13 6	193 13 8	803 6 7
B. Nowell & Co.	1,922 14 11	394 9 11	1,503 1 4	186 14 8	826 12 7
Harvey Bros.	1,906 8 3	420 14 8	‡ 1,574 9 6	184 3 4	803 7 2
R. Ballard, Ltd.	1,758 6 0	379 0 0	1,379 12 0	175 12 0	724 14 9
Woodham & Sons	1,743 0 0	359 0 0	1,319 10 0	166 10 0	678 10 0
Mowlem & Co.	1,646 6 4	369 12 6	1,330 1 8	157 6 3	705 7 8
Lawrence & Thacker	1,600 16 0	398 19 8	1,372 11 8	163 12 0	777 19 6
G. Wimpey & Co.	1,592 10 0	360 0 0	1,328 0 0	169 0 0	718 0 0
J. Macklin	1,577 12 0	396 13 1	1,416 0 6	199 1 1	766 9 9
W. Neave & Son*	1,443 12 0	332 13 8	1,186 19 6	156 3 5	655 12 6

LONDON.—For making up roadway and paving footways of Gunterstone-road extension, for the Fulham Borough Council. Mr. F. Wood, Borough Surveyor, Town Hall, Fulham, S.W.:—

	Roadway.	Footway.
B. Nowell & Co.*	£390 0 0 ..	—
J. T. Mears	415 0 0 ..	—
G. Wimpey & Co.	455 0 0 ..	—
H. J. Greenham	480 0 0 ..	—
J. Ellis & Co.	—	£113 7 6
Croft Granite Co., Ltd.	— ..	122 0 0‡
F. Fowles	577 15 8 ..	148 16 0
Alternate Tender	497 15 8 ..	—

[Surveyor's estimate, £120.]

‡ Taking up and relaying good paving, extra £5.

LONDON.—For making up roadway and paving footways of Elswick-street, Fulham, for the Fulham Borough Council. Mr. F. Wood, Borough Engineer, Town Hall, Fulham, S.W.:—

	Roadway.	Footway.
Harvey Bros.‡	£387 7 7 ..	£175 19 0
J. T. Mears*	440 0 0 ..	—
F. Fowles	444 0 0 ..	124 0 0
G. Wimpey & Co.	479 0 0 ..	—
H. J. Greenham	486 0 0 ..	—
B. Nowell & Co.‡	500 0 0 ..	—
J. Ellis & Co.	— ..	97 10 0
Imperial Stone Co.	— ..	99 0 0
Croft Granite Co., Ltd.‡	— ..	108 0 0

[Surveyor's estimate, £98.]

‡ No deposit.

LONDON.—For wood-paving works, for the Kensington Royal Borough Council. Mr. Wm. Weaver, Borough Engineer, Town Hall, Kensington High-street:—

—	Lancaster-road. Per super yard. s. d.	Wright's-lane and Marloes-road. Per super yard. s. d.	Old Brompton-road. Per super yard. s. d.	Ladbroke-grove. Per super yard. s. d.
Acme Flooring & Paving Co. (1904), Ltd.	9 9	9 9	7 11*	7 0*
Improved Wood Pavement Co., Ltd.	9 5*	9 5*	8 2	8 2
W. Griffiths & Co., Ltd.	9 6	9 6	8 6	7 5
J. Mowlem & Co., Ltd.	10 9	10 9	8 7	7 4
B. Nowell & Co.	11 9	10 4	8 3	8 5

TENDERS—*Continued on page 537.*

COMPETITIONS, CONTRACTS AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Required.	Premiums.	Designs to be Delivered
*Public Library	Peterborough Council	50*l*., 25*l*., and 15*l*.	June 30
*Shire Hall, Bury St. Edmunds	West Suffolk Standing Joint Comitt.	50*l*., 30*l*., 20*l*.	July 2

CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, &c., supplied by	Tenders to be Delivered
Taking Down Sheds and Removing Materials	Manchester Gas Committee	C. Nickson, Gas Department, Town Hall, Manchester	May 14
Extension of Weetwood Hall, near Wooler	.....	Dickson, Archer, & Thorp, Solicitors, Alnwick	do.
Cottage at Weetwood Farm	.....	do.	do.
Six Electric Tramcars and Water Sprinkler	Pietermaritzburg Corporation	Mordey & Dawbarn, 82, Victoria-street, London, S.W.	May 16
Police Station at Dodworth, near Barnsley	West Riding County Council	J. Vickers Edwards, County Architect, Wakefield	do.
Heating Apparatus, Malin Bridge Council School	Sheffield Corporation	H. I. Potter, A.R.I.B.A., 115, Norfolk-street, Sheffield	do.
Materials, Sewage Works	Eccles Corporation	G. W. Willis, Sewage Works, Peel Green-road, Patricroft	do.
Outbuildings at Isolation Hospital, Beaufort	Ebbw Vale U.D.C.	T. J. Thomas, Town Surveyor, Ebbw Vale	do.
Welsh Church at Senghenydd	.....	I. J. Thomas, Wellington House, Senghenydd	do.
Dual Desks for Schools	Waterloo-with-Seaforth U.D.C.	J. I. Thompson, Clerk, Town Hall, Waterloo, Liverpool	do.
Alterations to 150 and 1790, High-street, Elgin	.....	J. Jamieson, Architect, 51, High-street, Elgin	do.
Water Tanks	Chorley Corporation	J. Mills, Town Clerk, Chorley	do.
Riverside Wall	Exeter City Council	T. Moulding, City Engineer and Surveyor, Exeter	do.
Gasholder Tank Work	Ayr, etc., Gas Company	Gasworks, Damside-street, Newton-on-Ayr, N.B.	do.
350 Tons of Broken Granite	Stowmarket U.D.C.	P. C. G. Hayward, Clerk, Stowmarket	do.
Four Houses, Drighlington	Miss S. J. Liley	T. A. Buttery & S. B. Birds, Architects, Queen-street, Morley	do.
Road Improvement, Kingston Main Road	Leatherhead U.D.C.	T. Salkield, Engineer and Surveyor, Council Offices, Leatherhead	May 17
Open Air Swiming Bath, Rottingdean	Brighton Guardians	B. Burfield, Clerk, Parochial Offices, Brighton	do.
Stores	Swansea Corporation	B. Mackenzie, Cray Reservoir Works, Breconshire	do.
Painting, etc., Great Eastern-street Bridge	London County Council	Engineer's Department, County Hall, Spring-gardens, S.W.	do.
Ashpit Cleansing	Bradford Cleansing Committee	E. Call, Destructor Works, Hammerton-street, Bradford	do.
Street Works, Station-terrace, etc., Caerphilly	Caerphilly U.D.C.	A. O. Harpur, Surveyor, Council Offices, Caerphilly	do.
Street Works, Garth-street, etc., Taff's Well	do.	do.	do.
Street Works, Lower Commercial-street, Senghenydd	do.	do.	do.
Sewerage Works, Peel-street, etc.	East Stonehouse U.D.C.	F. A. Wiblin, Surveyor, Town Hall, East Stonehouse, Devon	do.
Usworth Water Supply Works	Chester-le-Street R.D.C.	J. H. Mole, Surveyor to Council, Chester-le-Street	do.
Materials and Hauling for Main Roads	Monmouthshire County Council	W. Tanner, County Surveyor, Newport, Monmouth	do.
Twelve Houses at Treharris	The Oakland No. 2 Building Society	Osborne & Rees, Architects, Shingrig-road, Nelson, Glam.	do.
A Chapel, High-street, Mountain Ash	.....	T. W. Millar, Architect and Surveyor, Mountain Ash	do.
Tar and Ammoniacal Liquor	Lanark Gas Consumers Company	Mr. Stewart, Manager at the Works	do.
Two Dwelling-houses, Letterkenny	Mr. R. M'Cullagh	J. M'Intyre, Architect, Letterkenny	do.
Two Dwelling-houses, Swallow-lane, Golcar	.....	A. Shaw, Architect, Golcar	do.
*Extending a Building at Schools	St. George-in-the-East Guardians	Clerk's Office, Raine-street, Old Gravel-lane, E.	do.
Carting of Gravel	South Stoneham R.D.C.	W. J. Potter, District Surveyor, "Glenroy"	May 18
Materials for Steel Foundry	East India Railway Company	C. W. Young, Secretary, Nicholas-lane, London, E.C.	do.
Hematite Pig Iron	do.	do.	do.
Sixty-four Tenement Dwellings	Manchester Sanitary Committee	City Architect, Town Hall, Manchester	do.
Two Shops with Workrooms over	do.	do.	do.
Making-up Titchfield-rd. & Uckfield-rd., Enfield Lock	Enfield U.D.C.	R. Collins, Surveyor to the Council, Public Offices, Enfield	do.
Additions, etc., to Warehouse, etc., Ferry-rd., Bristol	Messrs. T. T. Chard & Sons	H. Williams, Architect, Alliance-chambers, Corn-street, Bristol	do.
Bathrooms, etc., at Union Workhouse	Market Bosworth Guardians	W. M. Sykes, Chapel-street, Ibstock	do.
Materials	Ham U.D.C.	W. Warner, Surveyor, Ham Common	do.
Cast-iron Tank at South Elmsall Sewage Works	Hemsworth R.D.C.	T. H. Richardson, Hemsworth, near Wakefield	do.
Two Gas Engines, New Wortley Gasworks	Leeds Corporation	R. H. Townsley, Gas Offices, Leeds	do.
11,000 Tons of Derbyshire Lime	do.	do.	do.
Gas Oil for Manufacture of Carburetted Water Gas	do.	do.	do.
Tubes, Bricks, Flags	do.	do.	do.
5,800 yds. of 6-in. Cast-iron Water Mains	Epsom U.D.C.	W. V. Graham, M.Inst.C.E., 5, Queen Anne's-gate, Westminster	do.
Cables	Brighouse Corporation	Lacey, Sillar, & Leigh, 2, Queen Anne's-gate, Westminster	May 19
Broughton-street Sewer	Edinburgh City Council	Burgh Surveyor, City-chambers, Edinburgh	do.
House at Llandough	Mr. J. Lloyd Roach	J. H. Thomas, Secretary, Pentwyn, Llandaff	do.
Furniture for Nurses' Home at Withington	Chorlton Guardians	D. S. Bloomfield, Clerk, Union Offices, All Saints, Manchester	do.
Sewer, Plough-lane, Beddington	Croydon R.D.C.	R. M. Chart, F.S.I., Surveyor to the Council	do.
Alterations, etc., Finsbury-road Council School	Brighton Education Committee	T. Simpson & Son, 17, Ship-street, Brighton	do.
Making-up Station-road and Retreat-road	Southend-on-Sea Corporation	E. J. Elford, Borough Surveyor, Southend-on-Sea	do.
School, New Elgin	Elgin School Board	A. & R. M'Culloch, Architects, 3, Bernard-street, Leith	do.
Alterations, etc., at Farmhouse, Croy, Pluscarden	.....	J. Wittet, Architect, Elgin	do.
Rebuilding Stable Wing at Auchertyre	.....	do.	do.
Additions, etc., to Steading, Easter Kellas	.....	do.	do.
10,000 sq. yds. of 2½-in. thick Concrete Flags	Turton U.D.C.	V. W. Laithwaite, Sur., Council Offices, Bromley Cross, nr. Bolton	do.
Seven Cast-iron Sewer Ventilating Shafts, etc.	do.	do.	do.
140 lineal yds. of 9-in. Earthenware Pipe Sewer	do.	do.	do.
Alterations & Additions to Farm Buildings, Napsbury	Visiting Committee, Napsbury Asy.	W. G. Austin, Clerk, Guildhall, Westminster, S.W.	do.
Shop, etc., Sheringham	Co-operative Society	T. Inglis Goldie, A.R.I.B.A., Church-street, Sheringham	do.
Two Dwelling-houses, Varley-road, Slaithwaite	.....	A. Shaw, Architect, Golcar	do.
Work at Tormartin Rectory, Chippenham	.....	C. E. Ponting, Diocesan Surveyor, Marlborough	do.
Shop Fronts, etc., at Central Stores	Star Co-operative Soc., Chelmsford	C. & W. H. Pertwee, Architects, Bank-chambers, Chelmsford	do.
Stones and Rolling	Carrickfergus U.D.C.	J. Boyd, Clerk, Town Hall, Carrickfergus	do.
Footpath, etc.	do.	do.	do.
Sewage Farm Pumping Engines	Darlington Corporation	G. Winter, Borough Surveyor, Darlington	May 20
Waterworks	Wiveliscombe U.D.C.	T. V. Pearse, Clerk, Wiveliscombe	do.
Dressed Granite Kerb and Channel	Brighton Corporation	F. J. C. May, Borough Engineer and Surveyor, Town Hall, Brighton	do.
Repairs, etc., at Chartham Asylum	.....	W. J. Jennings, Architect, 4, St. Margarets-street, Canterbury	do.
Centring of Four Arches of Old Bridge	Ayr Corporation	J. Young, Town Surveyor, Ayr	May 21
Outfall Sewer	Rugby U.D.C.	D. G. Macdonald, Surveyor to Council, Rugby	do.
Sewers, Brighouse and Denholme Gate-road	Brighouse Corporation	A. M. Fowler, C.E., 1, St. Peter's-square, Manchester	do.
Sewers, Badger-hill to Lillands-lane	do.	do.	do.
Sewers, Toothill Bank to Rosemary-lane	do.	do.	do.
Sewers, Ogden-lane	do.	do.	do.
Sewers, River-street	do.	do.	do.
3,029 yds. of Cast-Iron Water Pipes, etc.	Tyldesley-with-Shakerley U.D.C.	R. H. Gurinan, Water Engineer, Tyldesley, near Manchester	do.
15-inch Water Main	do.	J. Brooke Smith, Council's Engineer and Surveyor	do.
Two 100-kw. Steam Dynamos	Mexborough U.D.C.	Engineer's Office, Electricty Works, Mexborough	do.
Repair of Roads, Strathdearn (21¼ and 19¼ miles)	.....	A. Mackenzie, C.E., Surveyor, Kingussie	do.
Repair of Roads, Kingussie Division (51¼ miles)	.....	do.	do.
Repair of Timber Bridges	.....	do.	do.
Painting at Cemetery	Selby Burial Board	E. Townend, Clerk, Abbey-place, Selby	do.
House, Mount Pleasant, Goole	.....	H. Sherwood, Mount Pleasant, Goole	do.
Taking Down Brick Chimney	Glasgow Corporation	J. R. Sutherland, Eng., Waterworks Office, 45, John-st., Glasgow	May 23
Public Hall, Institute, and Swimming Bath	Com., Llanhilleth Workmen's Inst.	D. Lloyd, Architect, Llanhilleth	do.
Infectious Hospital, Selby	.....	Tennant & Bagley, Architects and Surveyors, Pontefract	do.
Slater Work at Granton New Works	Edinburgh, etc., Gas Commissioners	W. R. Herring, M.Inst.C.E., New-street Works, Edinburgh	do.
Sewer, Shield-row	Stanley U.D.C.	J. Routledge, Surveyor, Council Offices, Stanley	do.
Bridge to carry Bo'ness-road, Grangemouth	Caledonian Railway Company	Engineer, Buchanan-street Station, Glasgow	do.
Road Works, Standish, near Wigan	Standish with Langtree U.D.C.	Heaton, Ralph, & Heaton, Engineers, Wigan	do.
Sewer Works, Carlton, near Barnsley	Barnsley R.D.C.	W. J. Lomax, Engineer, 11, Fold-street, Bolton	do.
Conversion of Pail Closets	Stockport Parks Committee	J. Atkinson, Borough Surveyor, Stockport	do.
Workshops and Gymnasium, Chelmsford	Essex Industrial School Committee	F. Whitmore, Architect, 17, Duke-street, Chelmsford	do.

CONTRACTS.—*Continued.*

Nature of Work or Materials,	By whom Advertised.	Forms of Tender, &c., supplied by	Tenders to be Delivered
Two Resids., Willow Hall Estate, Burnley-rd., Halifax		G. Buckley & Son, Architects, Tower-chambers, Halifax	May 24
Materials	Leyland U.D.C.	Surveyor's Office, 21, Towngate, Leyland	do.
Electricity Supply Extension	Partick Town Council	J. Donaldson, Town Clerk, Burgh-chambers, Partick	do.
Tarpaving Materials	Woodford U.D.C.	W. Farrington, Surveyor, Council Offices, Woodford Green	do.
Rebuilding of Bridge over the Dutch River	Doncaster Corporation	Mr. Crabtree, Borough Surveyor, Doncaster	May 25
Lighting Feeders, Mains, and Roadwork	Handsworth U.D.C.	H. Ward, Clerk, Council House, Handsworth, near Birmingham	do.
Lighting Streets and Roads	Milford Parish Council	G. Barr, Clerk, Milford	do.
Covered Service Reservoir, Wood-la., Rothwell, Haigh	Rothwell U.D.C.	W. E. Richardson, Architect, Rothwell near Leeds	do.
Market Hall, Shops, etc., Oldham	Markets and Baths Committee	Leeming & Leeming, Architects, 117, Victoria-st., Westminster	do.
Rebuilding Arch	Bicester R.D.C.	G. Walsh, Clerk, Bicester	do.
Making-up Passage	Ramsgate Corporation	T. G. Taylor, Borough Engineer, Albion House, Ramsgate	do.
30 Houses near Rhymney Railway Station at Pengam	Glan-y-nant Building Club	P. V. Jones, Architect and Surveyor, Hengoed	May 26
Boys' Grammar School	Bingley Grammar School Trust	W. Rhodes Nunns, Architect, Market-street, Bingley	do.
Wesleyan Chapel and Schools, High Bentham, Kendal		J. F. Curwen, F.R.I.B.A., 26, Highgate, Kendal	do.
Sewers, West Drayton	Uxbridge R.D.C.	J. Freebairn Stow, Engineer, Corn Exchange, Uxbridge	do.
*Wood Paving Works	Hampstead Borough Council	O. E. Winter, Town Hall, Haverstock-hill, N.W.	do.
Fairburn Waterworks	Pontefract R.D.C.	J. Waugh, C.E., Sunbridge-chambers, Bradford	May 27
Stores	Darwen Gas Committee	A. H. Smith, Gas Engineer, Darwen	do.
1,610 cubic yds. of 2-in. gauge Broken Granite	Ashford U.D.C.	W. Terrill, Surveyor, Ashford, Kent	do.
*Painting and Cleaning Works, Darent Asylum	Metropolitan Asylums Board	Office of the Board, Embankment, E.C.	do.
Overhead Equipment, Trolley Wires, Poles, etc.	Kilmarnock Corporation	W. Middlemas, Town Clerk, Kilmarnock	May 28
Rolling Stock	do.	do.	do.
Wiring of Generating Station and Shed	do.	do.	do.
Granite	Hadleigh U.D.C.	C. J. Grimwade, U.D.C. Offices, Hadleigh, Suffolk	do.
Main Sewers in Craigie District	Perth Town Council	R. M'Killop, Burgh Surveyor, 12, Tay-street, Perth	do.
Overhead Equipment	Royton and Crompton U.D.C.'s	R. P. Wilson, 66, Victoria-street, Westminster	do.
Cables	do.	do.	do.
Schoolhouse, Newmill, Keith	School Board of Keith	C. C. Doig, Architect, Elgin	do.
Masonic Hall, Whiteabbey	Building Committee	D. Coote, 6, Lewis-street, Belfast	do.
Residence, Creevagh, Ardee	Mr. J. G. M'Keever	F. Shaw, Architect, 36, South Frederick-street, Dublin	do.
Ten Houses, Fulford, York	Mr. G. Wood	A. H. Everist, Architect, 8, New-street, York	do.
Electricity Plant	Hornsey Town Council	R. Hammond, M.Inst.C.E., 64, Victoria-street, Westminster	May 30
Extension of Sewer in Church-lane	Southwick U.D.C.	G. W. Warr, Surveyor to Council, Southwick, Sussex	do.
1,000 Tons of Granite	Witham U.D.C.	W. B. Blood, Clerk, Witham, Essex	do.
Girls' Orphanage at Wilpshire		Briggs & Wolstenholme, Architects, Richmond-terrace, Blackburn	do.
Making-up, etc., Bolton-crescent	New Windsor Town Council	Borough Surveyor, Alma-road, Windsor	May 31
*Casual Wards & Receiving W'kh'se, Sheffield-st., etc.	Guardians of Strand Union	A. A. Kekwick, 18, Outer Temple, W.C.	do.
*New Post Office at Barnet	H.M. Works	H.M. Office of Works, Storey's-gate, S.W.	do.
*Making Up Roads	Acton District Council	Council's Surveyor, 57, High-street, Acton, W.	do.
*Extension of Town Hall	M.B. of Fulham	Borough Engineer, Town Hall, Fulham, S.W.	June 1
Bogie Passenger Engines and Tenders	East India Rv. Co.	C. W. Young, Secretary, Nicholas-lane, London, E.C.	do.
*Erection of Verandah at Workhouse	St. Leonard Shoreditch Guardians	F. J. Smith, Architect, Parliament-mansions, Victoria-street, S.W.	do.
Free Library Haslingden New-road	Rawtenstall Corporation	J. Johnson, C.E., Borough Surveyor, Municipal Offices, Rawtenstall	June 2
Stores	Penrikyber Navigation Colliery Co.	Secretary, Penrhiwceiber, R.S.O., Glam.	do.
Permanent Way (Tramways)	Rochester Corporation	E. Rotter, A.M.Inst.C.E., 47, Victoria-street, Westminster	June 3
Overhead Line	do.	do.	do.
Free Public Library	Teddington U.D.C.	H. A. Cheers, Architect, 35, Waldegrave-park, Twickenham	June 4
Stores and Materials	Pontypridd U.D.C.	E. Jones, Gas Engineer, Treforest Gasworks, near Pontypridd	June 6
Timber Groyne	Ventnor U.D.C.	E. J. Harvey, Surveyor to the Council	do.
*Alterations, etc., to Napsbury Asylum, near St. Albans	C. C. of Middlesex	Clerk to the Visiting Committee, Guildhall, Westminster, S.W.	do.
W. Cornwall Hospital & Dis., St. Clare-st., Penzance		O. Caldwell, F.R.I.B.A., Victoria-square, Penzance	June 9
*Balcony Dwellings for Working Classes	London County Council	Architect's Department, 11, Charing Cross-road, W.C.	June 14
*New Schools in Queen's-road, Nuneaton	Nuneaton & Chilvers Coton U.D.C.	H. Quick, 64, Hertford-street, Coventry	No date
*Alter. thirty-eight houses, Bull Cragg, Ferryhill-sta.		G. Walker, Ferryhill	do.
Customs House and Shipping Office, Port Talbot	Directors Port Talbot Rly., etc. Co.	E. Knott, Secretary, Port Talbot	do.
Two Cottages, Staveley		R. Mitchell, 17, Haymarket, Sheffield	do.
Two Stone Villas, ten miles from Sheffield		"Builder," 5, Sheffield *Telegraph*	do.
Two Cottages, Thurgoland		W. T. Campsall, 19, Fig Tree-lane, Sheffield	do.
Draining Agricultural Land near Brecon		B. L. Pritchard, Castle-street, Brecon	do.
House, Station Hill, Bridgend		P. J. Thomas, Architect, Bridgend	do.
Laboratories and Science Buildings, Exeter		J. Jerman, F.R.I.B.A., 1, Bedford-circus, Exeter	do.
Suspension Footbridge over River Swale		Rev. W. F. McNeile, Brafferton Vicarage, Helperby, Yorks	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in
*Building Department Manager	Co-operative Wholesale Society	Not Stated	May 23
*Clerk of Works	Cumberland & Westmorland Asym.	Not Stated	May 24
*Surveyor and Water Engineer	Lichfield Conduit Lands Trustees	150*l.*	do.
*General Assistant	Borough of Bromley	100*l.* per annum	May 25
*Head of Engineering Department	Northern Polytechnic	275*l.*	June 8
*Teacher of Cookery	do.	110*l.*	do.
*Teacher of Architectural Drawing	do.	Not Stated	do.
*Teacher of Brickwork	do.	Not Stated	do.

Those marked with an asterisk (*) are advertised in this Number. *Competitions*, iv. *Contracts*, iv. vi. viii. x. xii. *Public Appointments*, xviii.

TENDERS.—*Continued from page 535.*

LONDON.—For the supply of 7,000 electric lamps of British make, to be kept in stock at the general stores, 19, Charing Cross-road, for the London County Council:—

General Electric Co., Ltd.	£280 6 3‡
Sir Hiram Maxim Electrical and Engineering Co., Ltd.	248 15 0‡
Mackey's Electric Lamp Co., Ltd.	244 11 8‡
Edison and Swan United Electric Light Co., Ltd.	237 14 2§
Sunbeam Lamp Co., Ltd.*	235 10 5‡

‡ 2½ per cent. discount. § Net.

LONDON.—For repaving the carriageway, Lambeth Bridge, for the London County Council:—

	Per sq. yd. s. d.
Acme Flooring and Paving Co., Ltd.	9 8
J. Mowlem & Co., Ltd.	8 9
Improved Wood Pavement Co., Ltd., London*	8 8

MORTLAKE.—For building boundary wall, gates, and fencing, to Isolation Hospital in South Worple Way, for the Barnes Urban District Council. Mr. G. Bruce Toms, Surveyor to the Council, High-street, Mortlake:—

Crabb & Son	£470
A. Hunt & Son, 12, Archway-street, Barnes, S.W.*	465

MAIDSTONE.—For road making, Cornwallis-road, for the Urban District Council. Mr. T. F. Bunting, Borough Surveyor, Fair-meadow, Maidstone:—

M. Batchelor	£584 0	W. T. Burrows	£493 15
J. H. Bridge	496 0	Clarke & Epps*	440 0

[All of Maidstone.]

MORTLAKE.—For alterations and additions to the electricity station in High-street, for the Barnes Urban District Council. Mr. G. Bruce Toms, Surveyor to the Council, High-street, Mortlake:—

A. Hunt & Son	£524 0
B. E. Nightingale	514 0
Aldridge & Son, 78, Harlesden-road, Willesden Green, N.W.*	455 13

LONGLEAT.—For house fire protection:—

Hodder & Son	£2,100 0 0	Davies, Ball, & Co.	£1,560 0 0
T. Lydford	1,978 14 0	H. Franklin	1,533 14 6
S. Ambrose	1,890 6 0	W. Westwood	1,473 11 8
W. Hancock	1,883 16 0	J. Byard & Son	1,440 0 0
Jenkins & Sons	1,853 0 0	Smith & Marchant	1,425 0 0
A. Wills & Sons	1,839 0 0	J. Bird	1,340 0 0
J. Riley	1,834 0 0	A. L. Ponton	1,325 6 1
T. Vale & Sons	1,830 0 0	Tryhorn & Son	1,315 0 0
W. S. Bushnell	1,810 0 0	Rogers & Wood, London, S.E.*	1,296 9 0
Rowell & Sons	1,691 1 3	W. E. Bennett	1,230 0 0
R. Butcher & Son	1,585 17 0		

MIDDLESBROUGH.—For extending boiler house and engine house, etc., at electricity works, Snowdon-road, for the Electric Lighting Committee. Mr. Frank Baker, Borough Engineer. Quantities by Borough Engineer:—

H. Walker, Linthorpe, Middlesbrough* £3,056 10 0

PENARTH.—For erecting a public library and caretaker's house, for the Urban District Council. Mr. H. Snell, architect, Stanwell-road, Penarth:—

——	Library. £ s. d.	House. £ s. d.	— £ s. d.
J. Allan	4,100 0 0	520 0 0	4,620 0 0
T. Bevan	4,650 0 0	630 0 0	5,280 0 0
Blacker Bros.	4,075 10 0	546 0 0	4,621 10 0
F. Bond, Canton, Cardiff*	3,870 0 0	550 0 0	4,420 0 0
W. Bowers	4,420 0 0	585 15 3	5,005 15 3
D. Davies	4,735 0 0	670 0 0	5,405 0 0
D. W. Davies	4,680 0 0	635 0 0	5,315 0 0
E. R. Evans & Bros.	4,560 0 0	600 0 0	5,160 0 0
J. Jones	4,480 0 0	556 0 0	5,036 0 0
Lattey & Co.	4,965 0 0	717 13 10	5,682 13 10
W. T. Morgan	4,088 0 0	512 0 0	4,600 0 0
D. G. Price	4,951 15 6	685 14 7	5,637 10 1
J. S. Shepton	4,815 0 0	743 0 0	5,558 0 0
W. Symons & Co.	4,116 0 0	530 0 0	4,646 0 0
E. Turner & Sons	4,450 0 0	586 0 0	5,036 0 0

RASHCLIFFE (Huddersfield). — Accepted for erecting chapel and classrooms in Victoria-street. Mr. Ben Stocks, architect, St. Peter's-street, Huddersfield:—

Masons: W. Mallinson & Sons, Lockwood, Huddersfield	£458	0	0
Joiners: H. Atha, Newsome-road, Huddersfield	289	0	0
Plumber: T. A. Armitage, Huddersfield	99	10	0
Slater: T. B. Tunnacliffe, Huddersfield	75	10	0
Plasterer: G. H. Day, Milnsbridge, Huddersfield	59	0	0
Painter: R. Heaton, Paddock, Huddersfield	29	15	0
Concreter: J. Cooke, Huddersfield	31	4	10
Heating: Tomlinson & Milan, Ltd., Huddersfield	114	0	0

STOKE GABRIEL (Devonshire).—For erecting a stable, bullocks' house, etc., at Well Farm, Port Bridge, for Colonel R. W. Studdy. Mr. W. F. Tollitt, architect, 10, High-street, Totnes:—

H. Drew	£876	T. Brook, Totnes*	£747
Veale & Son	819	R. E. Narracott	735
G. Leaman	780		

SWANSEA.—For erecting a villa residence in Eversley-road, Coedsaeson, for Mr. T. Tustian. Mr. C. T. Ruthen, [architect, Bank-chambers, Heathfield-street, Swansea:—

H. Billings	£1,005	T. Richards	£943
D. Jenkins	993	J. Marles & Sons	885
Lloyd Bros., Argyle-street-yard, Swansea*	966		

WANSTEAD.—For main road special improvements, 1904, for Wanstead Urban District Council. Mr. C. H. Bressey, Surveyor, Council Offices, Wanstead, N.E.:—

—	High-street Paving.			Cambridge Park Tarpaving			Woodford-road Kerbing.		
	£	s.	d.	£	s.	d.	£	s.	d.
T. Adams	105	0	0	26	0	0	154	0	0
Atlas Stone Co.	135	0	0	35	0	0	183	0	0
F. Barry	112	16	10	23	17	6	142	10	0
Bradshaw & Co.	—			—			—		
Brooks, Ltd.	—			—			—		
F. Bradford	143	17	6	—			—		
J. Coney	—			—			—		
Croft Granite Co.	—			—			—		
Crouch Valley Brick and Tile Co.	107	10	0	—			—		
W. Delaney	110	6	0	18	6	0	137	0	0
J. Ellis & Co.	114	13	4	—			—		
Empire Stone Co.	116	0	0	—			—		
W. French & Co.	127	5	0	24	7	0	160	0	0
B. W. Glenny	—			—			—		
Goddard & Co.	—			22	12	6	—		
Grounds & Newton, Page Green, South Tottenham	111	1	8	*17	14	2	153	17	4
W. Griffiths	120	5	0	26	16	8	149	9	4
A. C. W. Hobman & Co.	—			—			—		
Hard York Nonslip Stone Co.	—			—			—		
Imperial Stone Co.	139	0	0	—			—		
J. Jackson, Clova-road, Forest Gate	*95	15	0	30	15	0	*140	0	0
E. Lamble	99	0	0	22	0	0	158	0	0
G. R. Mann	125	0	0	35	0	0	210	0	0
Parsons & Parsons	123	11	4	22	14	0	163	1	2
Phœnix Stone Co.	—			—			—		
A. W. Porter	119	10	0	25	0	0	150	0	0
E. J. Van Praagh & Co.	—			—			—		
Preston Granite Co.	—			—			—		
F. Smart & Co.	—			27	18	4	—		
A. C. Soan	127	4	2	27	12	6	180	0	0
Wilson, Border & Co.	114	13	4	26	18	4	18	14	8

ST. ALBANS.—For boring two tube wells at Kinsbourne Green, near Harpenden, for the Rural District Council. Mr. H. F. Mence, Surveyor, 14, London-road, St. Albans:—

T. Matthews	£310	0	R. Richards & Co. £180 0
W. A. Spanon	221	0	G. Eastell & Son 172 0
C. Isles & Co.	215	0	Le Grand & Sutcliff 169 0
Merryweather & Sons	210	5	Cheeld & Co., Chesham* 146 0
T. Tilley & Sons	210	0	C. Martin 144 0
J. Thom	189	0	

WEST HAM.—For making-up Chargeable-lane, for the Borough Council. Mr. J. G. Morley, Borough Engineer, Town Hall, West Ham, E.:—

D. T. Jackson	£2,263	18	10
T. Adams	2,233	19	6
J. Jackson	2,051	17	2
W. Griffiths	1,908	13	6
Parsons & Parsons	£1,847	18	3
G. J. Anderson, Poplar*	1,819	17	4

WIGAN.—For steel framework for car sheds, for the Corporation. Mr. J. Slevin, Borough Electrical and Tramway Engineer, Bradford-place, Wigan:—

A. Findlay & Co., Ltd.
B. Murray, Ltd.
Clyde Structural Iron Co., Ltd.
Gibbons Bros., Ltd.
Cross & Cross
Rubery & Co.
E. Wood & Co., Ltd., Manchester*
F. Morton & Co., Ltd.
J. Foster & Co., Ltd.
Pendleton Iron Works Co.
G. Thompson & Co.
G. Sands & Son
E. J. Raybould & Co., Ltd.
J. Booth
G. Taylor & Co.
E. C. & J. Keay, Ltd.
S. Parsons & Co., Ltd.
Redpath, Brown, & Co., Ltd.
J. Tildesley, Ltd.
Heenan & Froude, Ltd.
Graham, Morton, & Co., Ltd.
Widnes Foundry Co.
Manchester Iron & Steel Co.
Naylor Bros., Ltd.
Columbian Fireproofing Co., Ltd.
Phœnix Foundry Co., Ltd.
Workington Bridge & Boiler Co., Ltd.
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